e-Auction

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ACKNOWLEDGEMENT

It takes lot of effort to complete this project. I would like to gratefully acknowledge the contributions of several people who have helped me to complete this project.

Firstly, I would like to say that I am really fortunate to have a chance to work on this project under the guidance of Ms. AZWINA MOHD. YUSOF. I owe special thanks to Ms. AZWINA MOHD. YUSOF, for giving me the freedom, encouragement, support, motivation and guidance along the way. Her advice, suggestions and ideas contribution really helps a lot.

Second, I would like to say thanks you to my moderator, Dr. Lee Sai Peck for listening to my presentation patiently during VIVA. This really gives a lot of encouragement and motivation to me so that I can finish this project documentation with great confidence.

At last,I would like to thank my course mates and friends who helped me a lot in my project so that I can finish it within due date.

ABSTRACT

This study of project is the fulfillment for WXES 3181. The entire project, named e-Auction, involves developing a web based interaction system for the use of the public or company. This system will be built in a simple, high quality and fast way by using certain tools. The objective for developing this e-Auction System is to dynamic pricing marketplace for short lifecycle and unique products by delivering maximum value for suppliers and buyers .The system also will include user friendly feature.

In consideration of providing these advance features, Active Server Pages 3.0 has been chosen as the developing language, with the database support by Microsoft SQL server 2000, in the platform of Windows 2000, running with server IIS.

With reference and review from the other systems, the additive enhancement of features and cautious consideration of the existing constraint in bidding environment, is expectedly leading this project to the future implementation.

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CHAPTER 1

Introduction

1.1 Project Overview

As the internet community booming in our country, the enterprises awaken to the opportunities of the digital economy, there is also a growing realisation that the online business model has barely started. To gain a further acceleration in the development and adoption of new solutions and practices for e-Work and e-Commerce, the government also promotes the MSC since a few years ago.

To provide a global trading platform where practically anyone can trade goods online, this system has been developed. Members from this site buy and sell on the web. A wide variety of features and services have been developed so that members can buy and sell on the site quickly and conveniently. Buyers can purchase items in auction-style format. Sellers can get a higher profits using this type of commerce method.

Auction has become one of the successful business model on the net. It has shown its potential in the world of ecommerce.

There has been various types of auction held by the auctioneer since a few decades ago. Nowadays there are even more and more auction house in this field.

1.2 Statement of Problems

The major barrier for the online auction is the payment and goods transportation. The internet environment allows the auction environment to be changed but at the same time introduces new problems of its own. Here are the constraints faced:

- Security and Trust Issues - This is the main issues that we face in Malaysia. Even with the good security, peoples are still afraid to pass their credit card number to the seller. The auction also need trust that the auctioned item will be shipped as described in the auction list. At the same time, the seller needs the assurance that when the item is delivered, the buyer will pay the amount due. The personal details of the website users must also be kept in good security environment and cannot be misused for other purposes.
- Unlawful conduct issues - Rules and regulation regarding auctions over the internet vary from state to state and country to country. How this should be maintained is a nightmare for auction houses. The frauds in auction also need to be framed in order to deal with the law.
- Bidder collusion – A few number of bidders may collude and from a ring, where members of the ring agree not to outbid each other. At the end of the

auction, if a member of the ring owns the item, it is resold among the other members in a separate auctions or some other allocation procedure.

- Capacity constraints – The capacity constraints could adversely affect internet auctions. The satisfactory performance, reliability and availability of the application, processing systems and network infrastructure will be critical to attract and serve the large numbers of users.

Choice of right type of auction – Several types of auctions are available on the internet. The choice of auction is important for the success of the auction. The user prefers the auction type with higher transparency.

1.3 Project Objectives

The existence of the online auction has connected the seller and buyer, closer in time and space. It also become a superior dynamic pricing marketplace for short lifecycle and unique products by delivering maximum value for suppliers and buyers with less manual work and smoother operations.

The objectives I aim to achieve for this specific module are as following:

- ***Provides dynamic pricing market place***

  With the features such as starting price by the online auction, the seller can start at a price that he thinks is reasonable whilst the buyer can get the items at the price they think they are willing to pay.

- ***Provide an option for traditional auction***

Traditional auction will involve lots of paperwork and can be costly. Not every item is suitable for traditional auction. Whilst e-Auction can be suitable for many items.

- ***Investigate and study the various technique and skills***

  To develop a stable and useful web application, different technique and skills in developing system have to be study before choosing the suitable method to develop system in a web-based environment.

- ***Implement a simple and easy to use system***

  In many cases, good technology is not readily accepted because the product is not easy to use or efficient to use. A product's usability, acceptance, and marketability are often dependent on the user feeling that it is easy to learn and use.

- ***To achieve high-ability, reliability and confidentiality of the system***

  Good technology must be implemented to allow users accurately access all types of information and features. It is very important to achieve good response time, reliability and confidentiality.

- ***Enable merchandise or users to sell item***

  An e-Auction system can be helpful to increase the sales for the merchandise. It is a useful and low cost media for the merchandise to sell their items online.

- ***To create an object-oriented system to manage all resources and process involved***

1.4 Project Scope

e-Auction

In this system, the focus is on the web based auction application. The system involves the selling and bidding activities of the user on the stamps and postcard.

Generally, this system required the user to registered before they can get involved in the bidding activity. This is to ensure that the user can be tightly controlled especially that only genuine users are involved in the bidding activity. The users must register before they can post any item on this auction site.

This system will give the administrator full access in using the maintenances tools. The administrator can add or delete category when necessary.

The auction system will include a secure sign in system for user and the administrator. However, the transaction part (online payment) will not be included in this system. As the public in Malaysia does not trust the online transaction technology yet, it is not practical to include it in the system.

The winner of the auction will be given the contact information of the seller (auctioneer). Then the bidder can get the transaction done by contact the auctioneers.

Main Boundaries :

- The system can only be used by the public or merchandise who have registered as a valid member.
- System is restricted to certain items (stamps, first day cover and postcard) at this moment. May be ~~can be~~ upgraded in the future.
- This system will not include the credit card transaction or e-transaction.

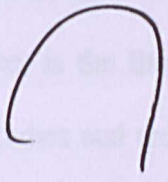
1.5 Expected Outcome

The e-Auction system is expected to achieve the following result :

- A system that will be able to adapt in local Malaysian community.
- System can be the superior dynamic pricing marketplace for short lifecycle and unique products by delivering maximum value for suppliers and buyers
- Including some basic function and meet some importance criteria such as stability, consistency, reliability and user friendly.
- An interactive trading platform where practically anyone can trade certain items.
- Easy to use interface for the user and the administrator.
- Sign in system that ensure only registered user can use certain facilities.
- System that allow for future enhancement as well as additional modules to extend the system functionality.

1.6 Project Schedule

A schedule is important to develop a system where the development phase follows certain time frame allocated. The Gantt chart, is one of the method to plan a schedule for the activities that is implement .



1.7 Report Layout

This layout is to give an overview of the major phases involved during development of the project:

Chapter 1 : Introduction

An overview of the major issues and of the project that includes the objective, project scope, project significance and project schedule.

Chapter 2 : Literature Review

This chapter is the literature review. Among the discuss topics are domains studies and technology reviews including operating system, web architecture, web server, programming languages and database.

Chapter 3 : Methodology

This chapter is the Methodology. This chapter discusses the Software Development Life Cycles, Methodology Consideration, information gathering techniques and the explanation about the development software and platform chosen to develop this system.

Chapter 4 : System Analysis

This chapter includes the system analysis of the project including functional requirements, non-functional requirements, hardware and software requirements on different developing tools.

Chapter 5 : System Design

This chapter includes the System Architecture and Functionality Design, Database Design and Interface Design.

Chapter 6 : System Implementation

This chapter covers the implementation and the coding process .

Chapter 7 : System Testing

This chapter will discuss about the testing of the software.

Chapter 8 : System Evaluation

This chapter will discuss the system evaluation like problems encountered during the development process, system strength and limitation and others.

1.8 Chapter Summary

This chapter is about introduction of this project. In Project Overview and Statement of Problems, relevant information and topics are being discussed consequentially. Statement of Problems, Project Objectives, Project Scope, Expected Outcome, Project Schedule, and Report Layout are the other topics is being include in this chapter.

CHAPTER 2

Literature Review

2.1 Domain Studies

Basically, this chapter is about some review on existing system that got the same or similar function. A study on existing system in a few aspects like the features, capabilities, the strengths and the weakness in the existing system. We do this to avoid from doing the same mistakes and to utilize the strengths of current system into our system.

2.1.1 Definition

Auction is actually a commerce tool used mainly where the price of goods or service cannot be prejudged. According to the definition in the dictionary, auction is a method of selling things in which each item is sold to the person who offers the most money for it. It is a market-driven sales instrument unlike the seller driven one that is common for supermarket.

2.1.2 Acronyms and Terminologies

Auctioneer- Person whose job is conducting auction.

Bid- Price offered in order to buy something, especially at an auction. In US, normally we call tender.

Bidder- Person or group that bids at an auction.

Classification of Auctions

- English Auction- English auctions are probably the most common type. To get an item, users bid the highest price they are willing to pay for and bidding activity stops when the auction duration is complete. The item is sold to the highest bidder at their bid price. English auctions also allow the seller to specify a reserve price below which the item will not be sold.
- Vickrey auction-Also called the Second-Price Sealed-Bid auction.The Vickrey auction allows for selling single items as does the English Auction. The difference is that the highest bidder obtains the item at the price offered by the second highest bidder. The advantages of this format is the bidders have the incentive to bid what they think the item is worth and not worry about what others will bid. Vickrey auction is rarely used in practice. This problem is due to two major reasons: the fear of an untruthful auctioneer and the reluctance of bidders to reveal their true valuations
- Reverse auction- Reverse Auctions are a specialized auction format that allows individuals to procure goods at the lowest possible price. Featuring decreasing incremental bidding, the format lets potential suppliers submit a bid and the supplier with the lowest price will win. In other words, prospective buyers can list any goods that they wish to buy, and then sellers bid to provide the best price.

- Dutch auction- Dutch auctions are special type of auction designed to handle the case where a seller has a number of identical items to sell. The seller should specify the minimum price (starting bid) and the exact number of items that are available at that price. The bidders bid at or above that minimum price for the number of items that they are interested in buying. At the end of the auction, the highest bidders earn the right to purchase those items at the minimum successful bid.
- Yankee auction- A Yankee Auction is a variation of the Dutch Auction where successful bidders pay what they bid as opposed to paying the price determined by the lowest qualified bidder (as in a Dutch Auction).
- First-Price Sealed-Bid Auction- A discriminative auction but with only one unit to be auctioned. Normally, the large corporate bodies and the government deploy this method.
- Decentralized Negotiation- Each seller or buyer is allowed to team freely around the room and negotiate contracts. After the contract is completed, the buyer or seller report to the central point and the price is usually on the blackboard at the time it is reported.
- Competitive Sealed-Bid Auction- In contract to the discriminative case, it is possible to design a mechanism for selling multiple units in which all bidders whose bids are among the N highest (winning) bids pay a uniform price. The uniform price is specified to the highest rejected bid.

Auction Protocol

As auctions have become the major phenomenon of electronic commerce during the last few years, there must be some protocol to guide the auction activity to avoid the possibilities to cheat. The non-electronic auction, the auctioneers use the physical norms understandable by all parties involved. In the e-version of auctions, the bidder no longer need to be confined near a stage. The processes of the e-Auction commonly work as the following steps:

1. Registration of the buyers and bidders
2. Browse the auctioned items in the site
3. Start the bidding process and processing
4. Declaration of the "winner" and deal processing
5. Transfer of auctioned item and collection of bid.

2.1.3 Existing System Review

There are a lot of auction company before the appearance of internet. After the eBay appear as the successful sample in this industry. There are many system that have some parts and concepts that similar to auction online system. We will try to study these systems and get some useful idea from the existing system.

Case Study 1

eBay

Linda and Pierre Omidyar have started their successful online auction site since 1995. First, it was called AuctionWeb. Later, they renamed it as eBay and has since become the premier online auction house. It has million of unique auction in the progress and many new items added each day.

On eBay, people can buy and sell almost everything we can think about. The company collects a submission fees plus a percentage of the sales amount. The submission fee is based on the amount of exposure sellers want the items to receive. This mean that the seller will have to pay more if he or she wants to post that item among the "featured auctions" category. Even listing the product in a bolded font requires a higher submission fees.

A database is used by eBay to manage the millions of auctions that it offers. This database does not only manage information about auctions but also about the user personal information and other relevant information. Therefore, when a potential bidder sees the goods the he is interested in , he can also check the profile of the seller.

The auction process begins when the seller post the details of the item for sale and fills in the appropriate registration information. The seller must specify a minimum opening bid. If the potential buyers feel that the price of the item is too high, the item may not receive any bid. In many cases, a reserve price is also set. Sellers might set the opening bid lower than the reserve price to generate bidding activity. If a successful bid is made, the seller and the buyer negotiate the details, warranty and other particulars.

A number of new businesses now use eBay as their mean of selling products. These businesses depend on eBay to remain up and running. Therefore, eBay invest quite a large amount of modal in high quality and continuous-ability computer hardware to make sure its system is always in good operation.

By implementing traditional marketing strategies and keeping the business process simple. eBay has offered a successful style towards ecommerce.

Pros

1.Wide variety of things to be bided

Cons

1.Too many items

2.Too many country

3.Too many steps in registering

4.Require credit card no to register

Case Study 2

Ubid.com

Founded in April 1997, uBid was a division of Creative Computers, a U.S. catalog retailer. The main purpose was to help the company move its excess and refurbished computing inventory online.

While consumers see them as a great way to save money and get great deals, online auctions continue to grow in popularity. UBid offers many different product categories, including computers; home office; housewares; sports and hobbies; jewelry and gifts; accessories; consumer electronics; digital cameras and video

The company has experienced exceptional growth, generating revenue of $48.2 million in its first full year of operations and revenue of $204.9 million for the year ending December 1999. They are still growing as more and more retailers and manufacturers see them as a beneficial way to move merchandise. Compaq, Hewlett Packard, Toshiba, Sony, Micron and others enterprise are using their services. The company focuses on the business-to-consumer business model.

Pros

1.Simple & Three category only.

Cons

1.Slow load time

2.Too many ads and not relevant links

Case Study 3

Lelong.com.my

Lelong.com.my was started by History Interbases Resources Sdn.Bhd., which is a relatively young company. Formed in 1998, the firm has quickly established a firm footing in the ecommerce arena with a growing membership subscription of hundred thousand members. As the founders of the pioneer auction site in Malaysia, Interbase has secured its position with the largest subscriber base for any site of this genre. Lelong.com.my is still continually striving to improve and develop its functionality without levying high costs.

Styled and functioning similar to the international auction site, eBay.com, Lelong.com.my powers a robust and secure avenue for trading in Malaysia. The idea of an auction site in Malaysia has taken off with tremendous responses. With the experience gained from running the site for the past few years, Interbase I wall poised to deliver a site that is full of quality content to its members. Based on Consumer-to-Consumer (C2C) transactions, Lelong.com.my is now moving to becoming a channel for Business-to-Consumer (B2C) relationships. Many distributors have realized the power of using the auction system and are now using Lelong.com.my to trade and grow their business.

Cons

1.Slow load time

2.Too complicated main page

3. Too many things to be filled in while register

2.1.4 Proposed System

E-Auction is a web application that provides dynamic pricing marketplace for certain products by delivering maximum value for sellers and buyers. It that enable public to register and post the item they want to sell or auction. With the English auction system, the item can be sold at a higher price.

For a new user of the system, he can browse the website to look for the items that interest him. Then, he can look at the description of the items and the starting price. If he feels that he would like to place a bid, he has to register as a valid member of the system. All he has to do is just fill up a form and then submit his personal details.

For the security purpose and to ensure that all user are genuine user, the user has to sign in each time he want to bid for an item or post an item on the website. This is to ensure that he has to be responsible for the action in the website. This is also to make sure nobody post some items that is not suitable.

If the user has to change the address or update other personal details, he can sign in to the change profiles part to change the necessary details. He will need to reconfirm. For the security reason, the user can also change the password regularly.

The administrator will has some extra access to the system to do some maintenance task. For example, the administrator can add or delete a category when due to its performance or response from the user.

The major function of the system is to provide a trading platform where practically anyone can trade practically anything on the website.

BENEFITS

Upon the completion of this project, we could gain some benefits:

- ✓ ***Dynamic pricing trading platform***

  Auction is a dynamic pricing business model where the buyer and the seller will get satisfaction upon the deal.

- ✓ ***Low cost advertising media***

  The seller will not have to pay for the high advertising fees. All he has to do is to post the item on the high traffic auction system, and then the buyer will come. This can reduce the operational cost.

- ✓ ***Easy to use system***

  This system will ease the user with the simple and user friendly user interface.

2.2 Technology Review

2.2.1 Development Models

Methodology

The methodology is being used to help in building the system in the process of preparing software specification , design and evaluation. Different type of development model in the software engineering is suitable for different type of project. For small project, the Waterfall model, V-shape model, and Prototyping model are more suitable. Incremental model and spiral model are usually used in the large project.

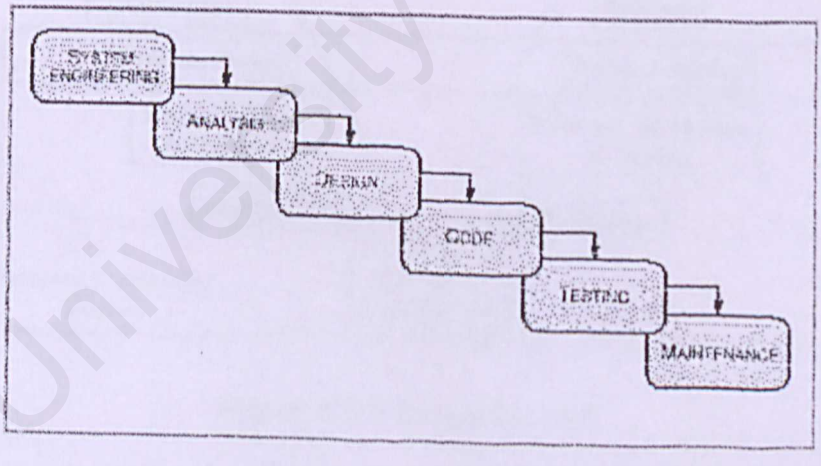


Figure 2.1: Waterfall Model

- ***Waterfall Model***

Benefits:

✓ Simple, familiar to most developers, easy to understand

✓ Easy to associate measures, milestones and deliverables with the different stages

Drawbacks

❖ Does not reflect how software is really developed

❖ Not applicable for many types of development

❖ Does not reflect the back-and-forth, iterative nature of problem solving

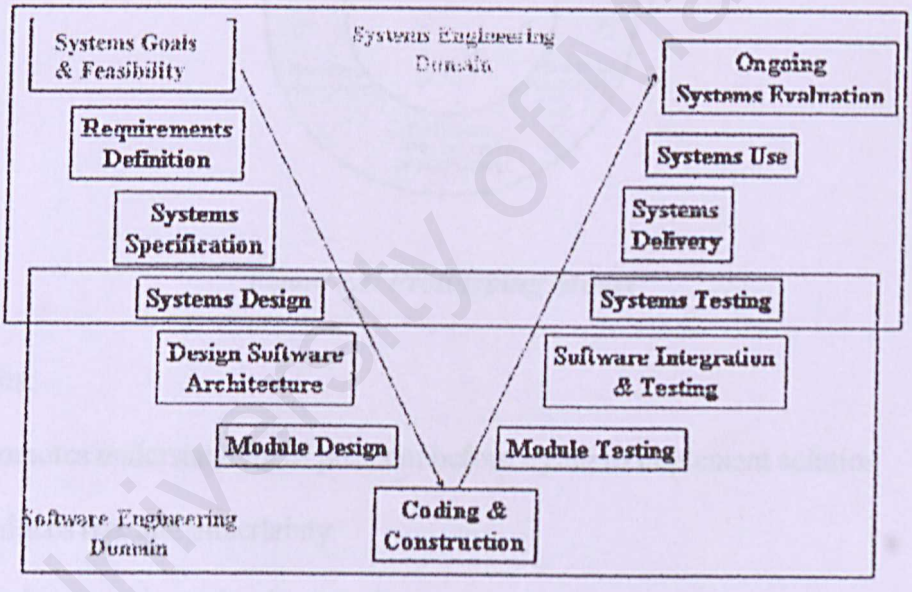


Figure 2.2: V-Shaped Model

- ***V-Shaped Model***

Benefits:

✓ Better spells out the role of different types of testing

✓ Involves the user in testing

Drawbacks

- ❖ Extensive testing may not always be cost-effective
- ❖ Some of the same drawbacks as waterfall

- ***Prototyping Model***

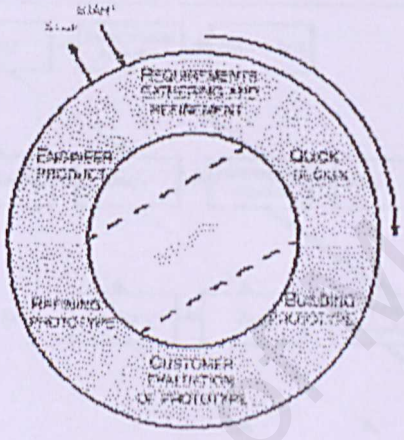


Figure 2.3: Prototyping Model

Benefits:

- ✓ Promotes understanding of problem before trying to implement solution
- ✓ Reduces risk and uncertainty
- ✓ Involves user in evaluating interface

Drawbacks:

- ❖ In systems where the problem is well understood or where the user interface is simple and straightforward, the extra time spent in prototyping is not warranted
- ❖ Prototyping can use up a lot of resources, especially if the prototype fails completely and must be scrapped

- ***Incremental Model.***

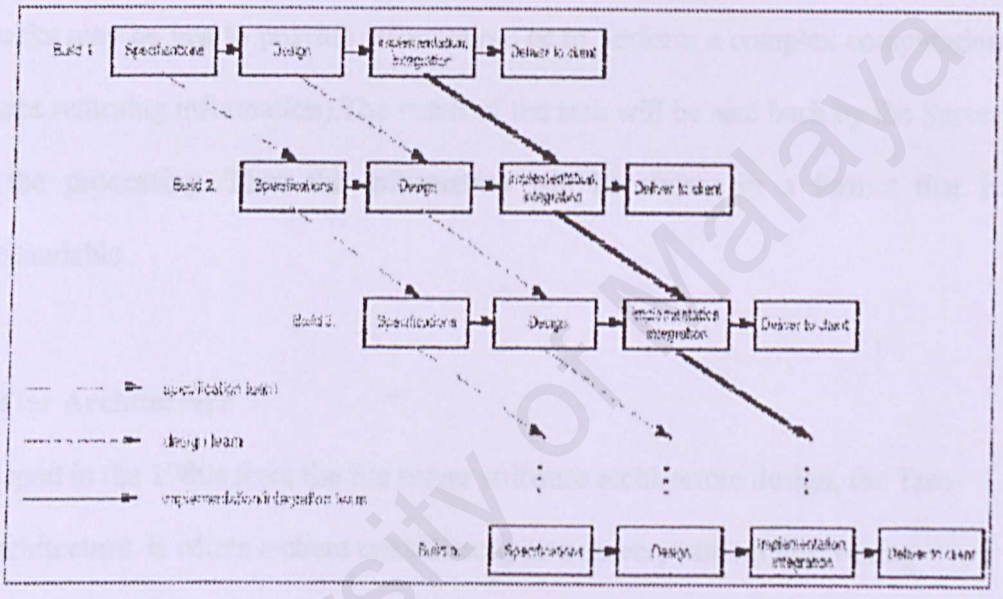


Figure 2.4: Incremental Model

Benefits:

- ✓ Reduces time to when customer receives some product
- ✓ Customer training can begin early
- ✓ Frequent releases allow problems to be fixed quickly
- ✓ Expertise can be applied to different releases

Drawbacks:

- ❖ Customer may not be satisfied with an incomplete product or with frequent changes to system
- ❖ Problem may not be easily decomposable

❖ Changes may have to be made to completed parts in order to work with new parts

2.2.2 System Architectures

Different type of system architectures can cater different needs of business models. A Client Server System is more structured than general distributed computing. The Client Server system involves a client that sends request to servers to execute tasks. The tasks may be just to provide information, or to perform a complex computation (perhaps returning information).The result of the task will be sent back by the Server after the processing. Then the information will be shown in a format that is understandable .

Two-Tier Architecture

Developed in the 1980s from the file server software architecture design, the Two-Tier architecture is where a client talks directly to a server, with no intervening server. Usually, it is for the small and medium environment.

In most of the two tier designs, most of the application portion of processing is in the client environment. The database management server usually provides the portion of the processing related to accessing data. However, there is a situation where it splits the processing management between client and server.

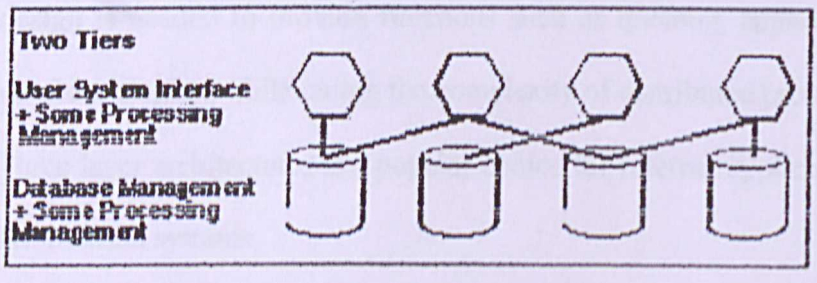


Fig 2.5 Two Tiers Architecture

The two tier architecture is intended to improve flexibility and scalability. The two tier improves usability because it makes it easier to provide a customized user system interface.

The approach that prototype an application in a small, two-tier environment, and then scale up by simply adding more users to the server will usually result in an ineffective system, because of the server becomes overwhelmed. The two tier architecture is suitable for following circumstances:

- when the number of users is expect to be less than 100
- for non-real-time information processing in non-complex systems that requires minimal operator intervention

Three Tier Architecture / Middleware

To overcome the limitations of the two tier architecture, the three tier architecture (a.k.a. three layer architectures) emerged in the 1990s. The third tier (middle tier server) is between the user interface (client) and the data management (server) components. This middle tier provides process management where business logic and rules are executed.

The three tier architecture is used when an effective distributed client/server design is needed to provide functions such as queuing, application execution, and database staging, while hiding the complexity of distributed processing from the user. Three layer architectures is a popular choice for Internet applications and net-centric information systems.

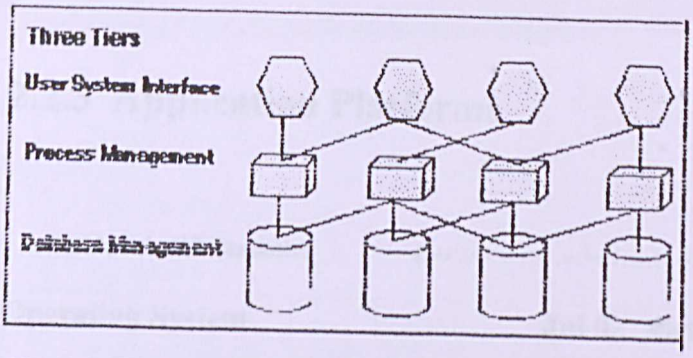


Fig 2.6 Three Tiers Architecture

The middle tier provides process management services (such as process development, process enactment, process monitoring, and process resourcing) that are shared by multiple applications. For example, there are a number of middle tier products that link a database system to a Web server. This allows users to request data from the database using forms displayed on a Web browser, and it enables the Web server to return dynamic Web pages based on the user's requests and profile.

The pros of the Three Tier Architecture

- ease of development and testing
- ease of administration
- scalability of servers
- performance (including both processing and network load)

2.2.3 Application Platforms

Table 2.1: OS Statistics (http://www.w3schools.com/browsers/browsers_stats.asp)

Operating System	Jul 02	Oct 02	Jan 03	Apr 03	Jul 03
Windows 98 / ME	64%	62%	60%	59%	40%
Windows XP					19%
Windows 2000	20%	24%	27%	29%	30%
Windows 95	4%	3%	2%	2%	2%
Windows NT	5%	4%	3%	3%	2%
MAC	1%	2%	2%	2%	2%

Operating systems that count for less than 0.5% are not listed.

Unix

Developed at AT&T Bell Laboratories, Unix was used on mini computers and workstations in the academic community because of it openness. Unix is a multi-user, multi-tasking operating system. Unix is suitable for very large, massively symmetric multiprocessing systems, systems with greater than eight CPUs. Unix system is probably better suited to a massive, single-box data center.

Pros:

- already exists for over 30 years
- available for almost any hardware platform

- variety of utility programs that called tool.
- made to keep on running
- secure and versatile
- scalable
- a powerful and mature OS

Cons:

- on proprietary systems: bundling and system specific implementation of commands/packages
- not userfriendly, confusing for beginners
- proprietary hardware is expensive

Linux

Linux is a UNIX-like operating system that was designed to provide personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive UNIX systems. Linux has a reputation as a very efficient and fast-performing system. Linux is a remarkably complete operating system, including a graphical user interface, an X Window System, TCP/IP, the Emacs editor, and other components usually found in a comprehensive UNIX system.

Unlike Windows and other proprietary systems, Linux is publicly open and extendible by contributors. Because it conforms to the Portable Operating System Interface standard user and programming interfaces, developers can write programs that can be ported to other operating systems. Linux is sometimes suggested as a

possible publicly-developed alternative to the desktop predominance of Microsoft Windows. Although Linux is popular among users already familiar with UNIX, it remains far behind Windows in numbers of users. [whatis.com].

Pros:

- free
- portable to any hardware platform
- made to keep on running
- secure and versatile
- scalable
- very short debug-time

Cons:

- many different distributions
- not userfriendly, confusing for beginners
- unsafe

Windows Family

Windows NT

Windows NT is a Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability. NT's technology is the base for the Microsoft successor operating system, Windows 2000. Windows NT (which may originally have stood for "New Technology," although Microsoft doesn't say) is actually two products: Microsoft NT Workstation and Microsoft NT Server. The Workstation is designed for users, especially business users, who need faster performance and a system a little more fail-safe than Windows 95 and Windows 98. The Server is designed for business machines that need to provide services for network-attached computers. The Server is required, together with an Internet server such as Microsoft's Internet Information Server (IIS), for a Windows system that plans to serve Web pages.

Windows NT Workstation: Microsoft says that 32-bit applications will run 20% faster on this system than on Windows 95 (assuming both have 32 megabytes of RAM). Since older 16-bit applications run in a separate address space, one can crash without crashing other applications or the operating system. Security and management features not available on Windows 95 are provided.

Windows NT Server: The NT Server is probably the second most installed network server operating system after Novell's NetWare operating system. Microsoft claims that its NT servers are beginning to replace both NetWare and the various UNIX-

based systems such as those of Sun Microsystems and Hewlett-Packard. NT Server 5.0, essentially became what was renamed Windows 2000. [whatis.com]

Advantages :

- improved windows NT diagnostics tool allows for easy examination of the system

  includes information on device driver information, network usage and system resource's such as IRQ, DMA, and IO address', all presented in a easy-to-view graphical tool.

- System policy editor and user profiles of windows NT allow system administrators to

  manage and maintain users' desktops in a consistent manor. System policies are used for the standardization of desktop configurations and control the user work environments and actions.

- The task manager of Windows NT is an integrated tool for monitoring applications

  and tasks, and reports key performance metrics of the Windows NT system. It provides information on each application and process that are running on the workstation, as well as memory and CPU usage.

- Point-to-point tunneling protocol (PPTP) of Windows NT provides a way to use public data networks, such as the internet, to create a virtual private network, connecting client PCs with servers. PPTP offers protocol encapsulation to support multiple protocol via TCP/IP connections and data encryption.

Windows 2000

Windows 2000 (W2K) is the latest commercial version of Microsoft's evolving Windows operating system. Previously called Windows NT 5.0, Microsoft emphasizes that Windows 2000 is evolutionary and "Built on NT Technology." Windows 2000 is designed to appeal to small business and professional users as well as to the more technical and larger business market for which the NT was designed. For many Windows 95 and Windows 98 users, Windows 2000 may be regarded as a step to take when purchasing their next computer.

The Windows 2000 product line consists of four products:

Windows 2000 Professional, aimed at individuals and businesses of all sizes. It includes security and mobile use enhancements. It is the most economical choice.

Windows 2000 Server, aimed at small-to-medium size businesses. It can function as a Web server and/or a workgroup (or branch office) server. It can be part of a two-way symmetric multiprocessing system. NT 4.0 servers can be upgraded to this server.

Windows 2000 Advanced Server, aimed at being a network operating system server and/or an application server, including those involving large databases. This server facilitates *clustering* and *load-balancing*. NT 4.0 servers with up to eight-way SMP can upgrade to this product.

Windows 2000 Datacenter Server, designed for large data warehouses, online transaction processing (OLTP), econometric analysis, and other applications requiring high-speed computation and large databases. The Datacenter Server supports up to 16-way SMP and up to 64 gigabytes of physical memory.

Windows 2000 is reported to be more stable (less apt to crash) than Windows 98/NT systems. A significant new feature is Microsoft's Active Directory, which, among other capabilities, enables a company to set up virtual private networks, to encrypt data locally or on the network, and to give users access to shared files in a consistent way from any network computer. [whatis.com]

Product	Description	Key Features
Windows 2000 Professional	Preferred 32 bit desktop platform for corporate users. Replaces Windows 9x	Synchronization Manager. Internet Printing Protocol. Plug and Play. EFS. Enhanced security features. Multiple monitor support. Support for USB and power management. 2 way SMB and support for 4Gb RAM.
Windows 2000 Server	Mainstream business server, providing file & print, application and terminal services	Active Directory. Kerberos based security. Terminal Services. 4 Way SMP.
Windows 2000 Advanced Server	Supports larger applications and bigger user base	As for Server plus : network load balancing. Clustering. 8Gb RAM support. 8 way SMP.
Windows 2000 Datacenter Server	High end, high availability server for enterprise networks	As for Advanced server plus : 32 way SMP. Enhanced clustering. 64Gb RAM supported.

Figure 1.– Windows 2000 family

2.2.4 Web Servers

Web server is a piece of computer software that can respond to a browser's request for a page, and deliver the page to the Web browser through the Internet

To run the server-side scripting, we need the suitable web server :

Internet Information server 5.0 - ASP, ASP.NET, CGI, Python, PHP

Apache - PHP, CGI/Perl, Python

Tomcat - CGI/Perl, JSP,Servlets, JavaBeans

iPlanet - JSP, Servlets, Enterprise JavaBeans

Chilisoft - ASP

Go webserver - LotusScript

Internet Information Server (IIS)

Internet Information Server (IIS) is bundled with Windows NT operating system.

Advantages of IIS

The advantages of IIS can be divided into two categories, which are : -

- The advances in HTTP-related service areas :

  The advancements in the http services area enable IIS to manage multiple web sites, tailor site or application specific setting. The index Server that served by IIS enables web clients with any browser to search a web site by filling in the fields of an HTML query form.

- The additional functionality in managing and developing application functionality :

  It also provides such advancements for the application development side such as transactional-based applications, process isolations, Secure Sockets layer (SSL) support, Active Data Object (ADO) and new development tools. For example, the certificate server which is a highly customizable server application for managing the issuance, revocation and renewal of digital certificates can help the organizations to perform authentication on a corporate Intranet or across the Internet.

- There is a Site Server Express that includes site analysis, usage analysis and publishing capabilities, enables the administrator to analyze log file data, crawl a web site to map content and check for broken links and easily publish content from browser to IIS server.

- IIS provides a high-speed, secure platform for publishing information on internal networks or Internet.

- Specifically designed to provide the kind of performance that is necessary for handling an increased number of web users. It is also designed to meet the requirement of the users who are connected with high-speed lines, such as ISDN and leased line.

The transaction ASP features of IIS also allows application with script add components to perform multiple actions. For example, a failure occurs during a particular transaction, IIS automatically backs up the server to the start of the transaction, allowing the user to recover from failure without any loss of data.

Apache Server

Apache is a freely available Web server that is distributed under an "open source" license. Version 2.0 runs on most Unix-based operating systems (such as Linux, Solaris, Digital UNIX, and AIX), on other UNIX/POSIX-derived systems (such as Rhapsody, BeOS, and BS2000/OSD), on AmigaOS, and on Windows 2000. According to the Netcraft (www.netcraft.com) Web server survey in February, 2001, 60% of all Web sites on the Internet are using Apache (62% including Apache derivatives), making Apache more widely used than all other Web servers combined.

Apache complies with the newest level of the Hypertext Transport Protocol, HTTP 1.1. Free support is provided through a bug reporting system and several Usenet newsgroups. Several companies offer priced support. [Whatis.com]

Table 2.1: Web Server Comparison

Apache	IIS
• Apache lagged behind in most studies, probably due to its lack of multithreading and the scalability problems of Linux.	• The benchmarks show that IIS serves up static documents a little faster in terms of speed.
• Apache on Linux doesn't scale very well, mostly due to the limitations of Linux in enterprise computing.	• IIS does scale respectably.
• Apache is by far the most widely used Web server and runs on Unix, Linux, Mac OS and Windows.	• The most obvious advantage of IIS is its tight integration with Microsoft and Windows technologies.

2.2.5 Web Browsers

(http://www.w3schools.com/browsers/browsers_chart.asp)

Windows

browsers	java	frames	tables	plug-ins	font size	font color	java script	style sheets	gif89	dhtml	I-Frames	Table color	XML
Explorer 6.0	X	X	X	X	X	X	X	X	X	X	X	X	X
Explorer 5.5	X	X	X	X	X	X	X	X	X	X	X	X	X
Explorer 5.0	X	X	X	X	X	X	X	X	X	X	X	X	s
Explorer 4.0	X	X	X	X	X	X	X	X	X	X	X	X	
Explorer 3.0	X	X	X	X	X	X	X	X	X		X	X	
Explorer 2.0			X		X	X							
Explorer 1.0			X		X	X							
Netscape 7.0	X	X	X	X	X	X	X	X	X	X	X	X	X
Netscape 6.1	X	X	X	X	X	X	X	X	X	X	X	X	X
Netscape 6.0	X	X	X	X	X	X	X	X	X	X	X	X	X
Navigator 4.7	X	X	X	X	X	X	X	X	X	X		X	
Navigator 4.5	X	X	X	X	X	X	X	X	X	X		X	
Navigator 3.0	X	X	X	X	X	X	X		X			X	
Navigator 2.0	X	X	X	X	X	X	s		X				

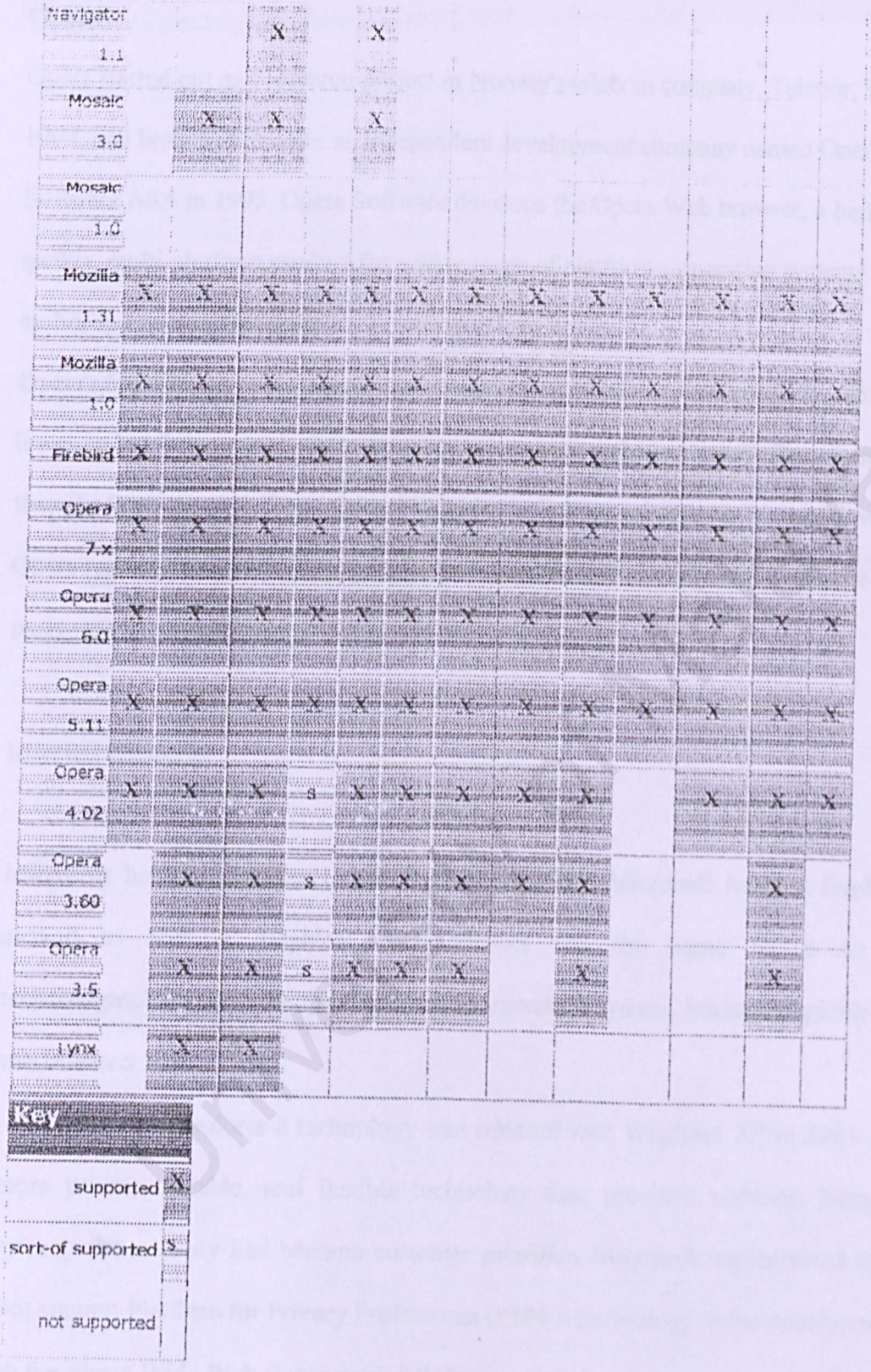


Table 2.2: Browser Comparison

Opera

Opera started out as a research project in Norway's telecom company, Telenor, in 1994, and branched out into an independent development company named Opera Software ASA in 1995. Opera Software develops the Opera Web browser, a high-quality, multi-platform product for a wide range of platforms, operating systems and embedded Internet products.

Opera's big selling point is speed - rather than using standard windows APIs, most of it was coded from scratch. Of course network conditions have a great effect on speed than the browser when fetching html documents; but once they have been retrieved, Opera renders them extremely quickly. Browsing local or cached documents, the pages render without even a flicker. [opera.com]

Internet Explorer

Microsoft hosted an Internet Strategy Day in 1995. Microsoft Internet Explorer arrived as both a graphical Web browser and the name for a set of technologies.Bundled with the Windows 95 operating system, Internet Explorer 1.0 was released.

Internet Explorer 6 technology was released with Windows XP in 2001 as a more private, reliable, and flexible technology than previous versions. Because privacy and security had become customer priorities, Microsoft implemented tools that support Platform for Privacy Preferences (P3P), a technology under development by the World Wide Web Consortium (W3C).

2.2.6 Programming Language

Hyper Text Markup Language (HTML)

HTML is a layout language. It contains commands that, like a word processor, tell the computer— in a very loose sense—what the content of the document is. Using HTML , we can tell the computer that a certain document contains a paragraph, a bulleted list, a table, or an image. The HTML rendering engine is responsible for displaying the text and images on the screen. The difference between HTML and word processor is that word processors work with proprietary formats, therefore one word processor cannot directly read another word processor's file format—they usually need a special program, called an import/export filter, to translate one file format to another. [30]

In contrast, HTML is an open, worldwide standard. If you create a file using the commands available in version 3.2 or earlier, it will display on almost any computer with any operating system—anywhere in the world.

Why HTML is important

- Until HTML, it wan not so easy to create screens full of information that anyone could read. The only way to display information is to write a program or using a presentation like PowerPoint. In this way, the constraint occurs when the output is only available to people using the same operating system and the same program—usually those with the same version of the program.
- It provides millions of people with access to information online that they could not or would not have seen any other way.

- HTML is the first easy method for non-programmers to display text and images on-screen without limiting the audience to those who own or have access to the same program (or a viewer) that the author used to create the content.
- In addition, browsers are universal content viewers and HTML is the universal file format which help universalizing the display of any output of information.

The limitations of HTML

Despite HTML's popularity, availability and the fact that it is a universal file format, HTML has several considered serious limitations as a way to create structured documents, as a layout language, and as a file format.

- Plain HTML has no way to specify the exact position of content on a page, either horizontally, vertically, or along the z-axis, which controls the layers in which objects appear.
- HTML is not a programming language, thus it has no decision-making capabilities.

HTML is a fixed language. Therefore, the limited command set forces developers to build proprietary extensions to perform more advanced functions.

Common Gateway Interface (CGI)

Gateway is a software program used to connect networks using different protocols so that they transfer data between the two. Before transferring, the program converts the data into a protocol-compatible form.

CGI is a standard for managing the interface between Web servers and the server software. It converts data from the Internet format into the format used by the operating system, e.g., UNIX or Windows.

CGI scripts are programs which are capable to manipulate text and communicate with other software. Usually these are written in C, C++, Java, and most frequently, in Perl.

The shortcomings of CGI: (1) CGI overhead slows down processing; (2) the appropriate languages are difficult to learn.

Java Server Page (JSP)

Java Server Pages is simply an HTML web page that contains additional bits of code that execute application logic to generate dynamic content. This application logic may involve Java Bean, JDBC objects, Enterprise Java Bean (EJB), and emote Method Invocation (RMI) objects, all of which can be easily accessed from a JSP page. For instance, a JSP page may contain HTML cod that displays static text and graphics, as well as method call to a JDBC object that accesses a database. When the page is displayed in a user-s browser, it will contain both the static HTMI. content, and the dynamic information retrieved from the database.

Java Server Pages technology allows web developers to easily develop and maintain dynamic web pages that leverage existing business systems. As apart of the Java technology family, JSP enables rapid development of web-based application that are platform-independent. JSP separates user interface from content generation, enabling designers to change the overall page layout without altering the underlying dynamic content. Therefore, it allows developers to create flexible code that can easily be

updated and reused. Due to the fact that JSP pages are automatically compiled as needed, web authors can make changes to presentation code without recompiling application logic. This makes JSP a more flexible method of generating dynamic web content than Java servlets.

PHP

This is by far the most popular scripting language at shared-hosting facilities. (Perl-based solutions are sometimes included at such facilities, but PHP is easy to configure for shared hosting.) PHP's focus has been on providing routines for doing lots of basic things very easily. There are native database interfaces to lots of databases (but no database independent libraries), lots of string processing routines and other strong features. The result is a language which beginners can get started with relatively easily, and yet it allows powerful scripting as well. Unfortunately it doesn't get to leverage Perl's wide variety of libraries. If one of the Perl scripting languages cloned PHP's basic library, then they'd be as easy to get started with, and even more powerful on the high-end, but until then, PHP is likely to remain the king of shared-hosting solutions.

Active Server Pages 3.0

ASP is a server-side technology, which also means that it is processed on the web server to generate HTML, while pure HTML is processed solely on the browser. It is definitely undeniable that applying server-side language has many advantages, which can hardly be found in most client-side languages.

ASP is found more effective in comparison with CGI and other programming languages. Besides, there is no additional software required for this approach. VBScript that plays the role of ASP default scripting language is fast and portable interpretation.

ASP has several major advantages over most other Web application development languages or environments, especially for internet development.

Why ASP?

Below are the tremendous advantages of ASP itself :

- ASP code resides in text files that are known to be easy to modify, even after deployment. Thus, it makes capable for developers to fix a problem remotely just by using a text editor.[31]
- ASP code is server-safe. This is due to the fact that ASP code runs only in a limited space, which means that you cannot natively read or write binary files with ASP.
- ASP code times out. IIS (Internet Information Server) stops executing ASP pages after 90 seconds by default. Therefore, if you accidentally write an endless loop, you won't tie up the server beyond the timeout interval.

- ASP applications are usually small because all the DLLs are already installed on the server, you need only deliver the code files, images and support files to make an ASP application runs.

The advantages of ASP over HTML

HTML is a simple and flexible formatting and layout language, but it has no programming constructs. In another words, if it is to display static text and images, HTML is simply perfect. But if it is to display content that changes often, or if you need to display content tailored for individuals, HTML is lacking. This is because HTML lacks any decision-making capability.

2.2.7 Authoring Tools

Microsoft FrontPage

As one part of the Microsoft Office family, FrontPage is one of the simplest HTML editors available in the market. It is suitable for beginner and business professionals in site management. Its easy to use visual interface and the "drag and drop" concept can help in building a simple website in just a few minutes.

Pros

- Visualize tools and the simple interface can be learn in a few minutes.
- Can add html code in the coding page easily

Cons

- The "drag and drop" concept sometime make it very hard to customize.
- Not all web server support it.

Macromedia Dreamweaver 4.0

A professional tools suitable for creating, building, and managing interactive websites and Internet applications. Macromedia Dreamweaver have a set of good "drag and drop" tools which is more advance compare to Frontpage.

Pros

- Can be integrated with others Macromedia Graphic editor.
- The extensions offers much more expandibility.
- Offer customizable interface while building website.
- The unique built-in Web objects like flash button make life much more easier.

- Animation capability is built in.

Cons

- Not easy to learn.

Microsoft Visual Interdev 6.0

Microsoft Visual Interdev 6.0 empowers web applications developers to rapidly build fully interactive, dynamic web sites. It is actually categorized into components, the client-side and server-side components.

Visual Interdev fully support both client and server side scripting. This means that you can write programs that run either on the server or on the user's web browser. For scripting languages, it supports both VBScript and Jscript (JavaScript). The Visual Interdev extensions add to the FrontPage extensions the capabilities to support ASP. With ASP, you can write scripts that execute on the server and directly reference Active X server components, such as connecting to database via ADO.

Pros

- Allows professional developement in design, build, debug and deploy cross-platform HTML and Script based web application faster than ever before.
- Offers powerful and integrated database tools. The complete set of database programming and design tools, allowing developers to build enterprise-class, data-driven web application within a single, integrated IDE.

It is full-featured, standard-based team developers specifically designed to meet the unique challenges of team-based web development

2.2.8 Database Management System

Analysis was done to determine the most appropriate database management system (DBMS) for storing and managing the require data. In order to choose a reliable database, the database must be able to ensure the safety and security of the data. The database is at the core of all mission-critical business applications. Choosing the wrong database can have drastic downstream results.

Selection was based on the consideration for usability and effectiveness in the *context of cross platform deploying, storage space required and the portability of the records.*

Microsoft Access 2000

One of the easiest ways of creating a database is by using Microsoft Access. This is because it has an easy menu driven interface that lets the user issue commands without an in depth understandings of Access. At its most basic level, Access can be used to develop simple personal Database Management System.

Access is an excellent platform for developing an application that will run a small business. Its wizards allow developers to quickly and easily build the foundation of application. The ability to build code modules allow developers to create code libraries of reusable functions and the ability to add code behind forms and reports allow them to create powerful custom forms and reports. (Balter, 1996)

Microsoft SQL Server 2000

SQL Server is an ideal database engine for powering web sites. Through tight integration with Internet Information Server, SQL Server can be queried and update via popular Web browser. SQL Server's native ODBC lets it inter-operate smoothly with the Internet Database Connector interface included with Internet Information Server.

Microsoft SQL Server maintains referential integrity and security, and ensures that operation can be recovered in the event of numerous types of failure. SQL Server can control the access for the type of info that can be retrieved by the user.

SQL Server support internet database integration. It allows the user to automate the publishing of database information in HTMI. documents. It allows us to build active web sites and let us conduct processes on the internet. When combining with IIS and the SQL Server Internet Connector, it gives user the complete internet database publishing capabilities.

Oracle

Oracle is the first software company to develop and deploy 100 percent internet – enabled enterprise software across its entire product line : database, server, enterprise business application, application development and decision support tools.

Oracle is the most – used relational database in the world. Because of Oracle's popularity, most database applications that are sold are built to work with Oracle, no matter which other databases they support. Nearly all "enterprise class" software has Oracle support built in, and Oracle has as good a reputation for scalability and stability as anyone in the database market.

Each distinct Oracle database referred to as an *instance*. The instance is the actual server process running on a computer. Each instances can support multiple users, schemas, and even databases. Applications generally communicate with an Oracle database using SQL*NET, a product that allows two computers running Oracle software to communicate with one another.

One of Oracle's main advantages is that its database runs on many platforms, and more importantly, the platform on which the databases is running is transparent to applications that communicate with the database server. Oracle takes care of all the data storage issue and also communicates with applications using standard protocols over a network. As long as the underlying operating system supports the appropriate protocol, Oracle is able to use it to communicate with applications running on other servers.

However, the bottom line of Oracle is that it is extremely expensive – at least in comparison to moderately priced products such as Microsoft SQL Server. Oracle also utilizes a Byzantine pricing structure along the lines of those that most enterprise application vendors have adopted, so it is impossible to discuss how much Oracle will cost.

2.2.9 Data Access Technology

MICROSOFT DATA ACCESSS TECHNOLOGY

There are many types of Microsoft's Data Access Technologies. There are VB SQL, Open Database Connectivity (ODBC), Data Access Object, Remote Data Object (RDO), AvtixeX Data Object (ADO) and OLE-DB.

OLE DB

OLE DB is Microsoft's strategic low-level application program interface for access to different data sources. OLE DB is a set of interfaces that are designed to provide data access to *all* data, regardless of type, format or location. It effectively "componentizes" database and related data processing functionality, breaking it up into interoperable components that can run as middleware on the client or server across a wide variety of applications. The OLE DB architecture provides for components such as direct data access interfaces, query engines, cursor engines, optimizers, business rules and transaction managers.

OLE DB includes not only the Structured Query Language capabilities of the Microsoft-sponsored standard data interface Open Database Connectivity (ODBC) but also includes access to data other than SQL data.

As a design from Microsoft's Component Object Model , OLE DB is a set of method(in earlier days, these might have been called *routines*) for reading and writing data. The object in OLE DB consist mainly of a data source object, a session object, a command object, and a rowset object. An application using OLE DB would use this request sequence:

1 Initialize OLE

2 Connect to a data source

3 Issue a command

4 Process the results

5 Release the data source object and uninitialize OLE

OLE once stood for "Object Link Embedding and "DB" for database. However, Microsoft no longer ascribe these meanings to the letters "OLE" and "DB".

Open Database Connectivity (ODBC)

ODBC is a method that used by visual basic to communicate with client/server databases. ODBC is a Windows technology that lets a database client application connect to a remote database. Residing on client-side computers, ODBC seeks to make every relational data source generic from the viewpoint of the client application.

ODBC is composed of three parts :

- A driver manager
- One or more drivers
- One or more data sources

It is a component of Microsoft's Windows Open System Architecture (WOSA). It provides a set of application program interface (API) functions, which makes it easier for developers to connect to a wide range of database formats that is it supports SQL. Developers can access a number of PC databases using ODBC. ODBC is based on the X/Open Call-Level Interface and uses SQL. During the run time, ODBC driver will communicate with other drivers and through a standard interface called Service

Provider Interface (SPI). It is a network independent technology because it employs replaceable network libraries.

However, the biggest downside to ODBC is that it must be able to support the capability to translate calls. This means that additional processing overhead can slow the data access bit.

ODBC And Its Relationship To OLE DB

So what is the relationship between ODBC and OLE DB? ODBC has become the *de facto* standard for standards-based client/server database access. ODBC provides a standards-based interface that requires SQL processing capabilities and is, in fact, optimized for that SQL-based approach. Literally millions of applications, from business intelligence packages to custom developed transactional applications rely on ODBC for standards-based access.

OLE DB builds upon the success of ODBC, but extends it to a component architecture that delivers higher level data-access interfaces, providing consistent access to SQL, non-SQL and eventually unstructured data sources across the enterprise and the Internet. In fact, for access to SQL-based data, OLE DB still uses ODBC, as it is the most optimized architecture for that area.

In addition, MERANT provides lightweight bridge technology that allows existing ODBC applications to use OLE DB Providers. This fundamental interoperability architecture allows both existing ODBC applications to access data from previously unavailable data via OLE DB *and* new OLE DB applications to access existing ODBC data, accelerating time to market and preserving existing investments.

2.2.10 DATA ACCESS OBJECT LIBRARIES

ActiveX Data Object (ADO)

ActiveX Data Object (ADO) is introduced as the primary means of building data-driven Web applications. Since then, ADO has become the standard API developers use to work with databases for applications built with Microsoft tools and technologies.

The ADO objects provide you with the fastest, easiest and most productive means for accessing all kinds of data sources. The ADO model strives to expose everything that the underlying data provider can do, while still adding value by giving you shortcuts for common operations.

ADO is Microsoft's strategic, high-level interface to all kinds of data. ADO provides consistent, high-performance access to data, whether you're creating a front-end database client or middle-tier business object using an application, tool, language, or even an Internet browser. ADO is the single data interface you need to know for 1- to n-tier client/server and Web-based data-driven solution development.

ADO is designed as an easy-to-use application level interface to Microsoft's newest and most powerful data access paradigm, OLE DB. OLE DB provides high-performance access to any data source, including relational and non-relational databases, email and file systems, text and graphics, custom business objects, and more. ADO is implemented with a small footprint, minimal network traffic in key Internet scenarios, and a minimal number of layers between the front-end and data source-all to provide a lightweight, high-performance interface. ADO is easy to use because it is called using a familiar metaphor - the OLE Automation interface, available from just about any tool and language on the market today. And since ADO

was designed to combine the best features of, and eventually replace Remote Data Objects (RDO) and Data Access Objects (DAO), it uses similar conventions with simplified semantics to make it easy to learn for today's developers.

2.3 Chapter Summary

This chapter covers the Domain Studies and Technology Review. It includes the Definition of Auction and Acronyms and Terminologies. Some existing System Review has been done. A system is being proposed.

The Technology Review includes the Development models, System Architectures, Application Platforms, Web Servers, Browsers, Programming languages, Authoring Tools, DBMS, Data Access Technologies and Data Access Object Library.

CHAPTER 3

Methodology

3.1 Software Development Life Cycle (SDLC)

In order to develop a system in an organized and effective way, it is necessary to follow a sequence of steps to accomplish a complete set of tasks, which is generally called a process. A process is referred to a series of steps involving activities, constraints, and resources that help us produce our intended output. Thus, it usually includes a set of tools and techniques. When the process involves the building of certain kind of product, it is referred as a life cycle. Therefore, the development process of e-Auction system is defined as the *System Life Cycle* or *System Development Life Cycle (SDLC)*, because it describes the life of the e-Auction system (which is the output product) from its conception to its implementation, use and maintenance.

3.2 Methodology Consideration

To make the development cycle efficient, to complete development within lowest possible cost keeping the highest quality, and to achieve the fastest turn-around, a good methodology must be chosen. A good methodology can help the system developer to plan, manage, control and evaluate info systems project. To make future maintenance easier and faster, a good methodology is an important factor. The uniqueness of different system need different methodology in development.

3.2.1 Benefits of Good Methodology

Good methodology could be helpful especially in a complicated project for software development.

Some benefits offers by a good methodology:

- It provides a guideline in the development process so that we can proceed smoothly.
- Every phase and task could be continued and completed in time.
- Can help us to identify the errors in the review phase.
- Can produce a more flexible systems and adequate documentation can be provided during the development process.
- The user needs and validation of user needs can be easily identified.
- Can help in monitoring the progress of the system development.
- Bring a better communication between the technical staff and the management.
- Get the clearer view and make sure everything is under control.

3.2.2 Conclusion On Development Methodology

The e-Auction system is based on the Object-Oriented system development methodology. Software in the Object-Oriented environment is a collection of discrete objects that encapsulate data and its functions to model the real world object. There are a few good reason for choosing Object-Oriented.

- ✓ Higher level abstraction – The Object-Oriented support abstraction at the object level because object encapsulated its data and functionalities
- ✓ Promotion of reusability In Object-Oriented approach, objects are reusable because they are modeled directly from the real world problem domain. Object is discrete and it stands on itself or within a small circle group. Therefore object can be kept in an object library for future use.
- ✓ Seamless transaction among different phases of software development- The OO approach uses the same language in analysis, design, programming and database design. This approach reduces complexity and redundancy and makes it more robust and less error prone.
- ✓ Encouragement of good programming language- OO approach raised the level of abstraction form the function level to the object level and this helps to promote clearer designs with easier implementation and offers better overall communication

The Unified Process

The approach that is being taken for e-Auction development is the Unified Process. This is one of the approaches used in the OO Software Development process for better understanding of OO concepts and a clearer overall view of OO system development. The Unified Process focuses on the combination of the best practices and processes along with the Object Management Group's Unified Modeling Language (UML).

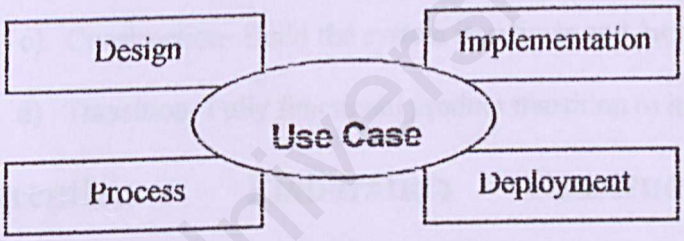
Overall Unified Process is :

-Iterative and incremental

-Use case driven

-Architecture centric

In UML, system architecture is defined in five views:



a) Use Case View- focuses on the scenarios executed by human users and external systems.

b) Design View- focuses on the vocabulary of the problem that the system is trying to solve and the elements of the solution to that problem.

c) Process View- focuses on the aspect of timing and the flow of control in the system.

d) Implementation View- focuses on the elements that are used to assemble to form the physical system.

e) Deployment View- focuses on the software, hardware and other physical elements' geographical distribution.

Unified Process Phases

In Unified Process, there are four phases in the software development life cycle. Each phase represents the time span between two major milestones. Within each phase, there are one or more iterations and each iteration results in an increment. The Unified Process and major milestones are shown below:

a) Inception- Defines the scope of the propose project, identify the critical risks and decide when and how to address them and develop business care.

b) Elaboration- Plan the proposed project, specify the identified features and baseline the architecture and finalize the business case for the project.

c) Construction- Build the system iteratively and incrementally

d) Transition- Fully functional product transition to its users.

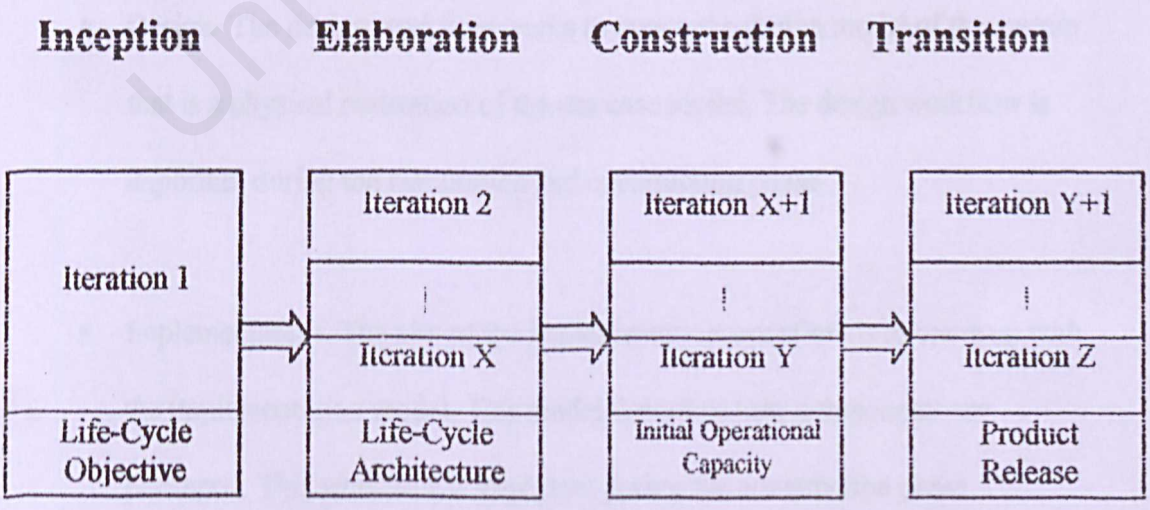


Fig3.1 Phases and Major Milestones

Workflow

In the Unified Process, five workflow cut across the four phases with each workflow requiring different effort and focus. Each workflow is associated with a set of activities, artifacts and workers. Workers are roles that individuals play in the life cycle process. Artifacts are deliverables such as models and prototypes. Activities are actions that produce the artifacts. The five workflows are:

- Requirements- The requirements workflow is primarily concerned with the use-case model of the system. This model is described using the UML's use case diagrams. The requirements workflow is particularly important during the inception and elaboration phase where most of the critical functionalities are elicited.

- Analysis- The analysis workflow builds the analysis model that realizes the use case model. It refines and structures the requirements of the system. The analysis is of particular importance during the elaboration phase.

- Design- The design workflow works to create the design model of the system that is a physical realization of the use case model. The design workflow is important during the elaboration and construction phase.

- Implementation- The aim of the implementation workflow is to come up with the implementation model. This model describes how components are packaged. This workflow is important during the construction phase.

- Test- The test model is the main outcome of the test workflow. The test model describes test plans and test cases that are to be performed. The bulk of this workflow happens in the construction phase.

3.2.3 Justification Of Methodology

The Unified Process is chosen based on its several convincing reasons that supports and routing throughout the whole developing progress of e-Auction system.

These are the convincing points and strength in applying the proposed methodology into my e-Auction system development:

i. Planning of each workflow before its commencement allows for more flexible scheduling of the life cycle. Even so, the each iteration still provides a time frame that acts as a general guide to avoid careless scheduling.

ii. The framework of the Unified Process is flexible and customizable in the sense that certain activities and artifacts may be skipped.

iii. The iterative and incremental approach of the Unified Process allows for changes that are not too costly to implement. In fact, defects that may plague the architecture are found earlier, thus reducing excessive rework.

iv. Unified Process approach towards iterations as mini projects with goals simplify and provide focus for development.

v. The iterative approach that has workflows cut across phases in a linear and sequential manner thus allowing for a look at all different system views at one time. This allows for early detection of risks and defects, thus reducing costs.

3.3 Information Gathering Methods

In order to fully understand the system, I have used a few methods to gather information about the system and the requirement of the system.

I. Internet Surfing

The internet have provided quite a lot of information in the similar system and lot of information on distributed system, development tools and technologies, programming languages, database, project methodology, and also client-server computing knowledge. Apart from that, there is some attractive website which can be used into my system because the user interface is a major factor in the system.

II. Books and References

One of the major references that provide quite a lot of information is from the Seniors' thesis in our faculty document room. The books also provide some information about the database system, design method and web design technic.

III. Observation of existing system

There are quite a lot of auction website on the net. By observing the existing system, I can learn from others experiences and avoid their weakness.

3.4 Conclusion On Tools and Technology

It is an important process in choosing the suitable technologies for developing system. After reviewing and analyzing the different technologies, the most appropriate platform and development tools has been chosen.

Selected Web Architecture

After reviewing the different architecture, I found out that the Three Tier architecture is more suitable to be applied in the development of e-Auction system to perform its auctioning functionality.

Benefits of a Three Tier Architecture

- ✓ Ease of development and testing.
- ✓ Processing is centralized in at the middle tier.
- ✓ Ease of administration.
- ✓ Performance balancing, rules sharing, organization.
- ✓ Parallel development of individual tiers can be done.
- ✓ Flexibility in resource allocation.
- ✓ Scalability of servers
- ✓ Encourage code reusability in middle tier.

Selected Platform

Windows 2000

I will choose Windows 2000 as the application platform to develop my project due to the reasons stated below:

- Windows 2000 is reported to be more stable than Windows 98 and NT
- Windows 2000 is a true multipurpose server operating system.
- It is considered the most easiest server operating system available.
- It is also one of the powerful operating system that integrates a variety of network services.
- The services it provides are designed to address requirements in every category and they are managed in a single way.
- There is a core set of services providing the platform not only for basic management features built into the operating system but also for value-added tools and solutions form Microsoft and third parties.
- Windows 2000 is a platform complete enough for building and hosting web based applications. It is the best platform to publish and share information securely over Intranet and Internet
- There is an extensive security support in Windows 2000. The comprehensive and usable security enables Windows 2000 to offer the most robust security model, which can control the access control of user in accessing certain file or application. The centralized Windows 2000 security subsystem uses advanced security design features that provide an exceptional level of system security. A password filter allows system administrators to increase password strength.

Selected Web Server

Internet Information Service (IIS)

Internet Information Server is a good option for developing this system. It is chosen for the following reasons:

- ✓ It supports multiple web server scenarios, ranging from simple web sites on an Intranet to large Internet Service Provider (ISP) web hosting farms.
- ✓ It provides a transactional-based web server that is tightly integrated with Windows 2000 operating system and also a number of components that make it easier to build dynamic web sites, manage content and analyse usage.
- ✓ The advancements in the http services area enable IIS to manage multiple web sites, tailor site or application specific setting. The index Server that served by IIS enables web clients with any browser to search a web site by filling in the fields of an HTML query form.
- ✓ It provides additional functionality in managing and developing application functionality such as advancements for the application development side. For example the transactional-based applications, process isolations, Secure Sockets layer (SSL) support, Active Data Object (ADO) and new development tools.
- ✓ IIS provides a high-speed, secure platform for publishing information on internal networks or Internet.
- ✓ It is specifically designed to handle an large number of web users.

- ✓ The transaction ASP features of IIS also allows application with script add components to perform multiple actions.

Selected Database Management System

Microsoft SQL Server 2000

I have chosen the Microsoft SQL Server 2000 because of the following reasons:

- ✓ It user friendly interface and can handle hundreds of transactions simultaneously.
- ✓ It works well with databases of any size.
- ✓ Scalable
- ✓ It is a viable solution to accommodate the vast storage requirements.
- ✓ Support internet database integration
- ✓ Integrity and security

Selected Programming Language

Active Server Pages 3.0

The main factor to chose ASP is because of the following reasons:

- ✓ It is a server-side technology. It is definitely undeniable that applying server-side language has many advantages over most client-side languages.
- ✓ ASP is found more effective in comparison with CGI and other programming languages.

- ✓ There is no additional software required for this approach.
- ✓ VBScript that plays the role of ASP default scripting language provides fast and portable interpretation.
- ✓ ASP code resides in text files. It is easy to modify. It can be modify just by using a text editor.
- ✓ ASP code is server-safe. This is due to the fact that ASP code runs only in a limited space, which means that you cannot natively read or write binary files with ASP.
- ✓ ASP applications are usually small because all the DLLs are already installed on the server.

Selected Development Tools

Microsoft Visual InterDev 6.0

Microsoft Visual Interdev 6.0 is chosen because of :

- ✓ Enable developers to build fully interactive, dynamic web sites rapidly.
- ✓ It includes the HTML Layout editor which assist in placing and layering Active controls.
- ✓ The Image Composer, Music Producer and Media Manager are utilities that help to create multimedia aspects to integrate with web sites.
- ✓ Support both client and server side scripting.
- ✓ Includes a complete set of database programming and design tools, allowing developers to build enterprise-class, data-driven web application within a single, integrated IDE.

3.5 Chapter Summary

This chapter covers the Software Development Life Cycle(SDLC), Methodology Consideration, Benefits of good methodology, Conclusion on development methodology. It also show the Information gathering methods and conclusion on tools and technology.

CHAPTER 4

System Analysis

4.1 System Requirement Analysis

4.1.1 Functional Requirements

Actors:

- **User** - Represent the users that use the e-Auction system for some activity like browse for item, bid and post item.
- **Administrator** – Represent the administrator that maintain the system.

Administrator Module

- Sign In

Allow administrator to sign in to the administrator section.

- Sign Out

Allow administrator to sign out from the administrator section.

- Delete User

Cancel user membership when necessary.

- Update administrator's profile

Update administrator's profile including change password.

User Module

- Register

Allow user to register as a valid member of the system before he can access the services like bidding and selling. This process collects the personal details of the user.

- Sign In

Allow registered user to sign in to the user section to gain access of the system.

- Sign Out

Allow user to sign out of the system.

- Post Items

Allow user to add an item to be bid.

- Bid Item

Allow user to place a bid for an item.

- Update Profile

For the users to change or update the personal details at the database.

- Change Password

For the users to change password for security reason.

- Select Category

  A user can browse through the category available in the auction site to look for certain items

- View Details

  For the users to view the description of the item.

4.1.2 Non-Functional Requirements

A non-functional or constraint describes a restriction the system that limits our choices for constructing a solution to the problem. These requirements are very subjective but are as important as the functional requirements. Non-functional requirements for this project is described as below:

- User friendly

  Users are allowed to use this system without any computer knowledge.

- Fast retrieval of information

  Users should be able to retrieve the information needed within reasonable time.

- Reliability

  The entire system must to the user as a consistency and an accuracy system. Problems and system failures will be prevented and minimized to enable the system to be a reliable system. The system will stable and consistent in all environments.

- Efficiency

  This system will ensure efficiencies, in system execution and data storage. The simplicity of the system will enable the new user familiar with the system in a short time.

- Flexibility

As the project's implementation is based on e-Auction system technologies, it is foreseeable that newer technologies that can work with existing web-based technologies will have no problem integrating in this system.

- *Maintainability and Expandability*

  Maintainability may be defined quantitatively as the ease with which software can be understood, corrected, adapted and enhanced. Maintainability is the degree to which architectural data or procedural design can be extended. e-Auction System is design to be expandable in the future.

- *Security*

The security features built in prevents unauthorized access into the full-text of the e-Auction, user must log in with correct user name and ID in order to access the full text of the e-Auction.

4.2 Runtime Requirement

4.2.1 Hardware Requirements

The recommended hardware requirements for the development environment are listed as the following :

- At least Pentium 133 MHz processor
- At least 16 MB RAM of memory
- At least 1 GB of hard disk space
- A SVGA Graphic Adapter
- Network Interface Card (NIC) and network connection with recommended bandwidth at 10 Mbps or more

4.2.2 Software Requirements

The recommended software requirements for the development environment are listed as the following :

- Microsoft Windows 95/98 or Windows 2000
- Internet Explorer 4.0 or above

Development Requirement

Hardware Requirements

The recommended hardware requirements for the development environment are listed as the following :

- A server with at least Pentium 133 MHz processor
- At least 32 MB RAM of memory
- At least 2 GB of hard disk space
- A SVGA Graphic Adapter
- Network Interface Card (NIC) and network connection with recommended bandwidth at 10 Mbps or more

Software Requirements

The recommended software requirements for the development environment are listed as the following :

- Microsoft Windows NT Server 4.0 or above
- Internet Information Server 5.0 (IIS)
- Active Server Page (ASP)
- Microsoft Visual InterDev 6.0

- Microsoft SQL Server 2000
- Microsoft Internet Explorer 4.0 or above

4.3 Chapter Summary

This chapter covers the System Requirement Analysis, Functional requirements and non-functional requirements, Runtime Requirement and Development Requirement.

CHAPTER 5

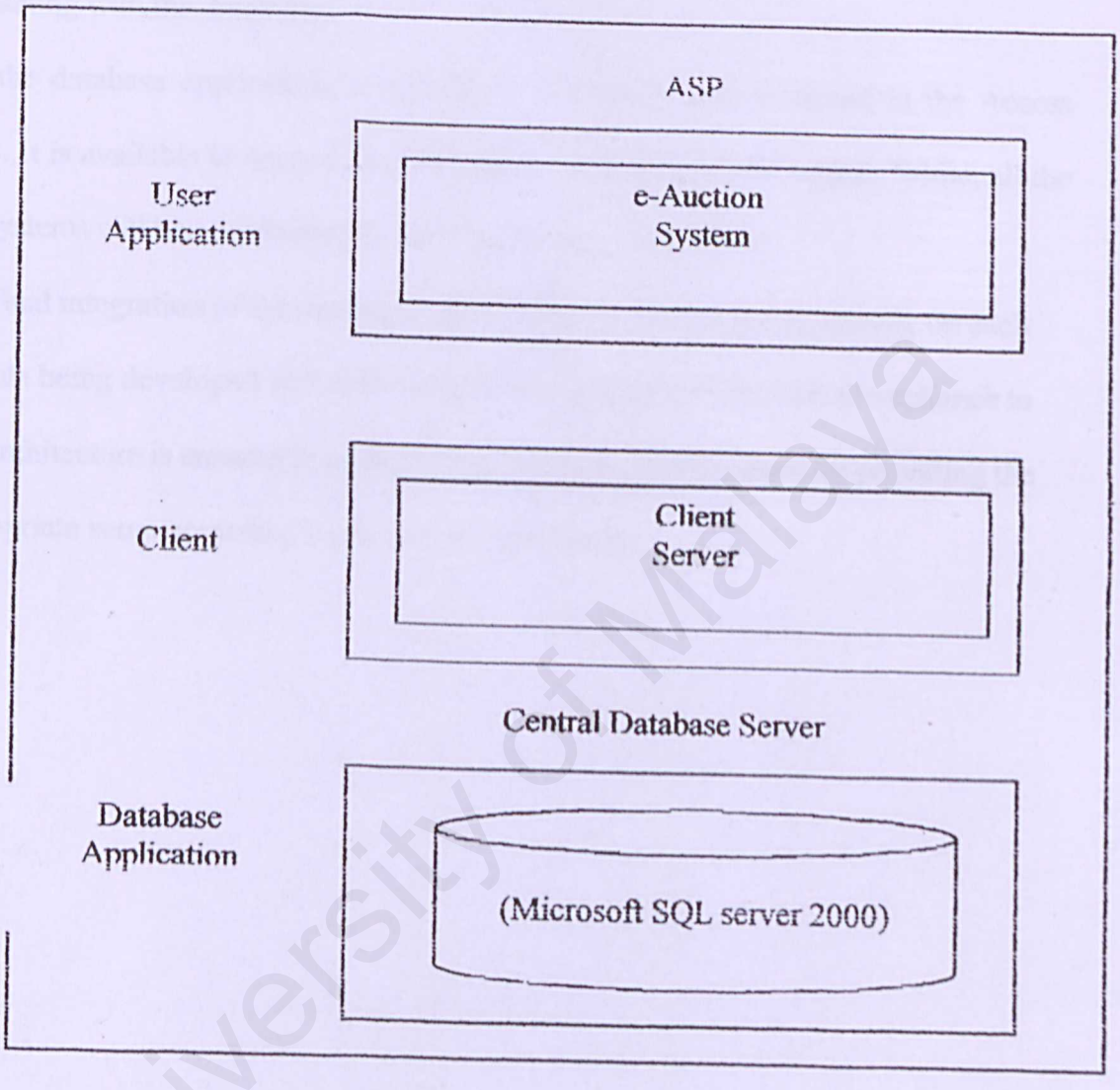
System Design

5.1 System Architecture

The e-Auction System is designed to leverage the traditional client / server architecture. It is divided into three sections: user application, client and database application. All the components were built into each tiers to fulfill its role and then tied together to form a final solution.

The following diagram depicts the overall e-Auction System:

Fig5.11 : e-Auction System Architecture



For the user application (e-Auction System), all the input and output will be processed by using ASP. So ASP would be used to display all the data in this level. In this level there have certain components to gather input variables or query for analysis. There is also a component to display the results of the analysis to the difference system users.

For the client part, there is a process, which perform the analysis. This tier resides on the store back office. All data in this level can be added, edited, and deleted by interacting with the database.

For the database application, a repository of relevant data is stored in the Access 2000. It is available to support the work performed the analysis engine. While, all the file systems will be coordinated by the Central Database Server.

The final integration of the separately developed modules depends heavily on each module being developed with adherence to this overall architecture. Compliance to this architecture is ensured in each module during its development by providing the appropriate setup according to the architecture design.

5.2 System Functionality Design

5.2.1 Use Case Diagram

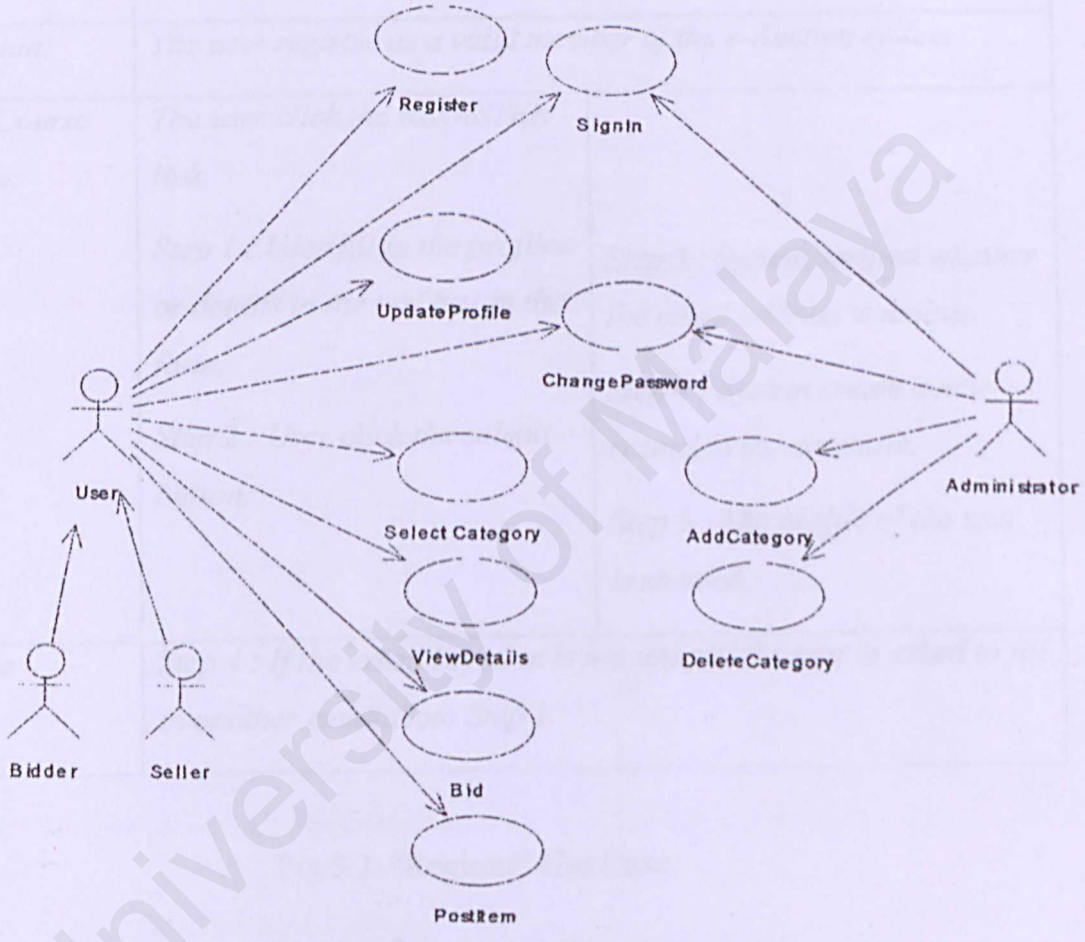


Fig 5.1 Use Case Diagram

Use Cases Design

Use Case Name:	*Register*	
Actor(s):	*User*	
Description:	*The user register as a valid member of the e-Auction system*	
Typical Course of Events:	*The user click the REGISTER link.* *Step 1 : User fill in the profiles or details in the text box in the form.* *Step 2 : User click the submit button.*	*Step 3 : System verified whether the email address is unique.* *Step 4 : System create a new record in the database.* *Step 5 : The profile of the user is showed.*
Alternate Course:	*Step 4 : If the email keyed in is not unique, the user is asked to fill in another email.Goto Step 1.*	

Fig 5.2 "Register" Use Case

Use Case Name:	*Sign In*	
Actor(s):	*User and Administrator*	
Description:	*The user sign in to utilise the e-Auction system or the administrator sign in to do some maintainance.*	
Typical Course of Events:	*The user click the SIGN IN link.* *Step 1 : User fill in the email address and password in the text box in the sign in form.* *Step 2 : User click the sign in button*	*Step 3 : System verified whether the email address and password is matched* *Step 4 : System greet the user.*
Alternate Course:	*Step 3 : If the user login as administrator , show the administrator mode for them to maintain the system.* *Step 4 : If the email and password do not matched, the user is asked to fill in again.Goto Step 1.*	

Fig 5.3 "Sign In" Use Case

Use Case Name:	*Update Profile*	
Actor(s):	*User*	
Description:	*The user update the personal details.*	
Typical Course of Events:	*The user click the UPDATE PROFILE link.* *Step 3 : User can change personal details .* *Step 4 : User click the submit button.*	*Step 1 : System checked whether the user sign in.* *Step 2 : If the user has sign in, system will show the profile.* *Step 5 : System will verified whether the necessary profile of the user is filled in.* *Step 6 : The personal details of the user is updated in the database.*
Alternate Course:	*Step 2 : If the user do not sign in, showed the sign in page.* *Step 5 : If not all necessary profile is filled in, go to Step 3 to resubmit.*	

Fig 5.4 "Update Profile" Use Case

Use Case Name:	*Change Password*	
Actor(s):	*User*	
Description:	*The user change password for security reason.*	
Typical Course of Events:	*The user click the CHANGE PASSWORD link.* *Step 3 : User can change password .* *Step 4 : User click the submit button.*	*Step 1 : System checked whether the user sign in.* *Step 2 : If the user has sign in, system will show change password page.* *Step 5 : System will verified whether the new password is matched.* *Step 6 : The password of the user is updated in the database.*
Alternate Course:	*Step 2 : If the user do not sign in, showed the sign in page.* *Step 5 : If the "retyped password" do not match with the new password, go to Step 3 to resubmit.*	

Fig 5.5 "Change Password" Use Case

Use Case Name:	*Select Category*	
Actor(s):	*User*	
Description:	*The user select certain category to be viewed.*	
Typical Course of Events:	*The user click the category he is interested in.* *Step 1 : User click on the link.*	*Step 2 : System show the Item ID, Item Name, Starting Price, Listing Date and Current Price.* *Step 4 : If no item in the category, the system will show no item.*
Alternate Course:		

Fig 5.6 "Select Category" Use Case

Use Case Name:	*View Details*	
Actor(s):	*User*	
Description:	*The user select certain item to be viewed.*	
Typical Course of Events:	*The user click the item id he is interested in.* *Step 1 : User click on the item id link.*	*Step 2 : System show the Item ID, Item Name, Starting Price, Listing Date, Current Price details and desctiption about the item.*
Alternate Course:		

Fig 5.7 "View Details" Use Case

Use Case Name:	*Bid*	
Actor(s):	*User*	
Description:	*The user place a bid on certain item.*	
Typical Course of Events:	*The user click the BID link.* *Step 1 : User click the bid button.* *Step 4 : User enter the amount he want to place the bid.* *Step 5 : User click the Bid On It button.*	*Step 2 : System checked whether the user sign in.* *Step 3 : If the user has sign in, system will show the bidding form.* *Step 6 : System will verified whether the bid amount filled in is valid.* *Step 7 : The system create a new bidding record in the database.*
Alternate Course:	*Step 3 : If the user do not sign in, showed the sign in page.* *Step 6 : If the bid amount is not valid, go to Step 4 to resubmit.*	

Fig 5.8 "Bid" Use Case

Use Case Name:	*Post Item*	
Actor(s):	*User*	
Description:	*The user post item to be sold.*	
Typical Course of Events:	*The user click the POST ITEM link.* *Step 1 : User click the POST ITEM button.* *Step 4 : User select the category he want to place the item in and fill in the details.* *Step 5 : User click the Post button.*	*Step 2 : System checked whether the user sign in.* *Step 3 : If the user has sign in, system will show the Post Item form.* *Step 6 : System will verified whether the necessary details is filled in .* *Step 7 : The system create a new item record in the database.* *Step 8 : The system will show the listing of the item.*
Alternate Course:	*Step 3 : If the user do not sign in, showed the sign in page.* *Step 6 : If the necessary details is not filled in, go to Step 4 to fill in again.*	

Fig 5.9 "Post item" Use Case

Use Case Name:	*Add Category*	
Actor(s):	*Administrator*	
Description:	*The administrator add a new category when necessary.*	
Typical Course of Events:	*The user click ADD CATEGORY link.* *Step 1 : The user click ADD CATEGORY link.* *Step 2 : The user enter the category name in the text box.*	*Step 3 : System add a new record in the database.* *Step 4 : System refresh to show the new category.*
Alternate Course:		

Fig 5.10 "Add Category" Use Case

Use Case Name:	*Delete Category*	
Actor(s):	*Administrator*	
Description:	*The administrator delete an existing category due to poor response.*	
Typical Course of Events:	*The user click DELETE CATEGORY link.* *Step 1 : The user click DELETE CATEGORY link.* *Step 2 : The user click the ~~Delete link at the same row~~ with category name .*	*Step 3 : System delete an existing record in the database.* *~~Step 4 : System refresh to show~~ the new layout.*
~~Alternate~~ Course:		

Fig 5.11 "Delete Category" Use Case

5.2.2 Sequence Diagram

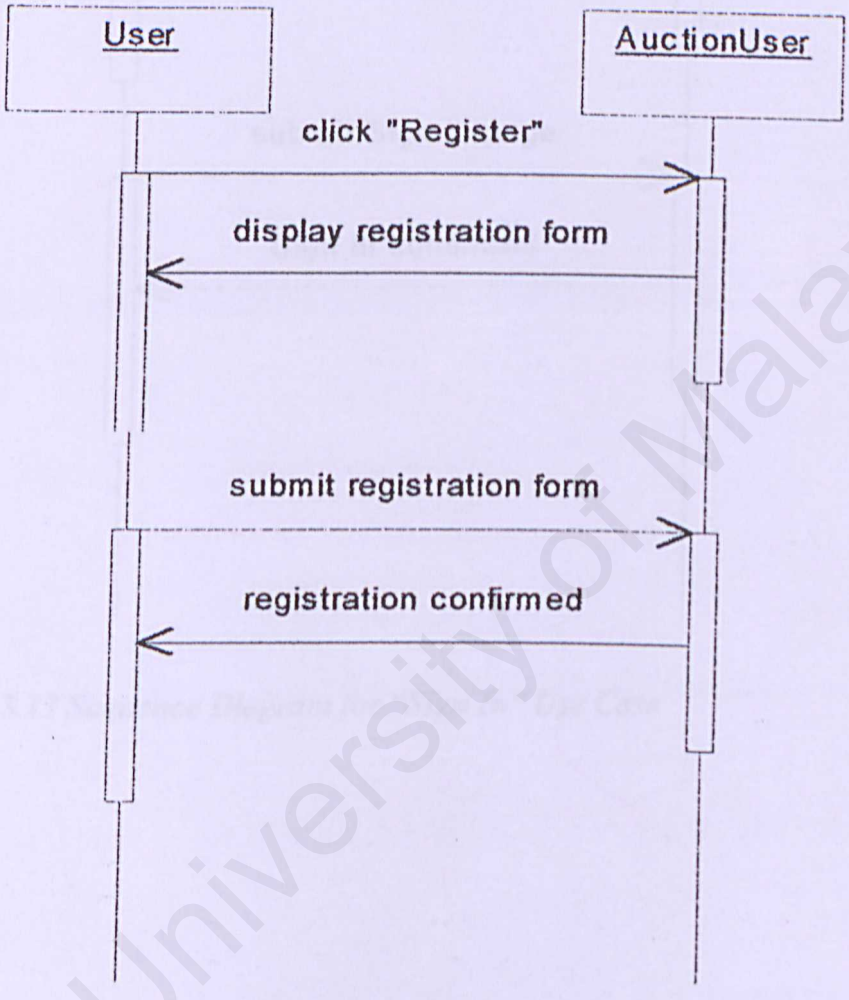


Fig 5.12 Sequence Diagram for "Register" Use Case

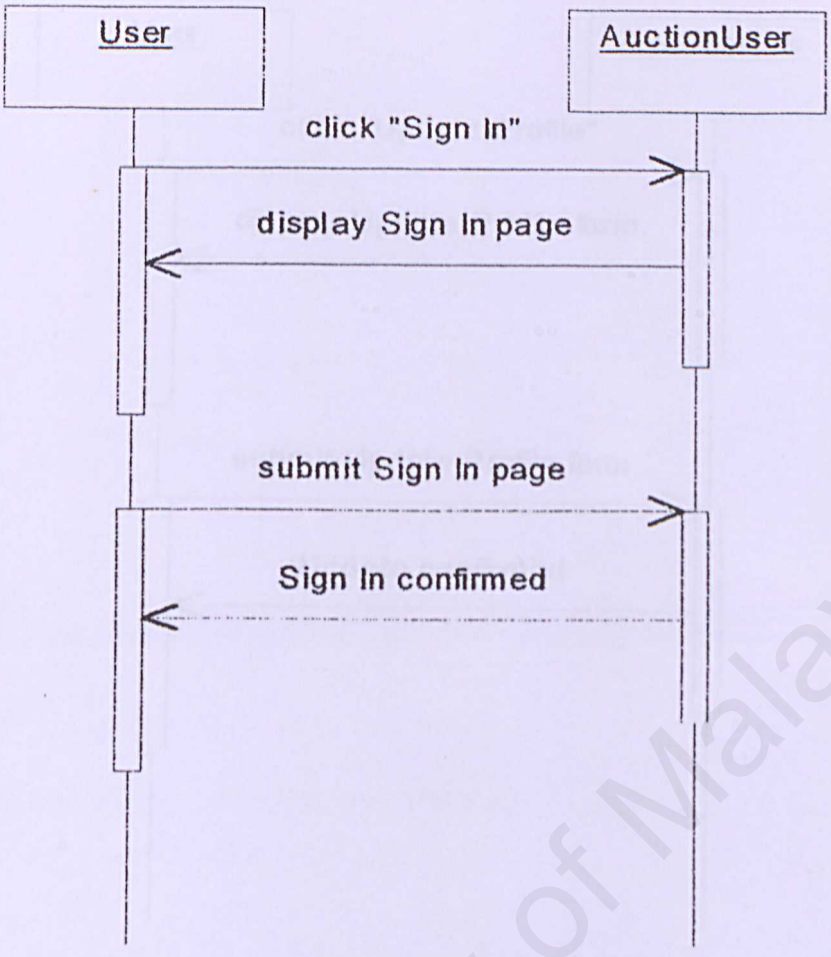


Fig 5.13 Sequence Diagram for "Sign In" Use Case

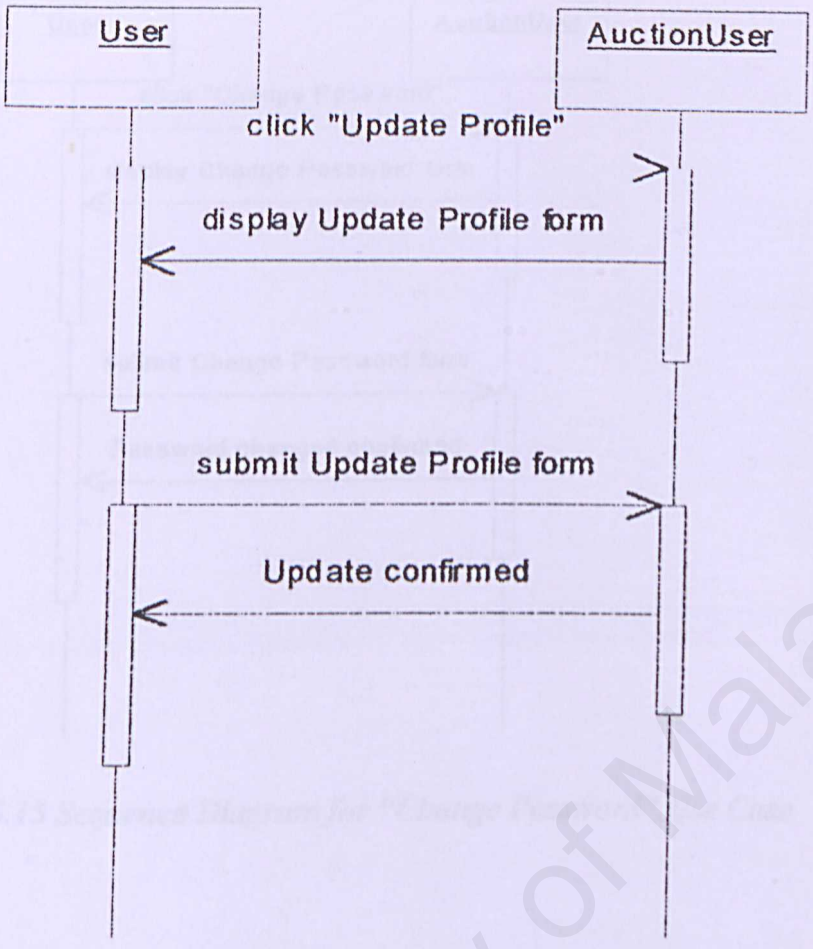


Fig 5.14 Sequence Diagram for "Update Profile" Use Case

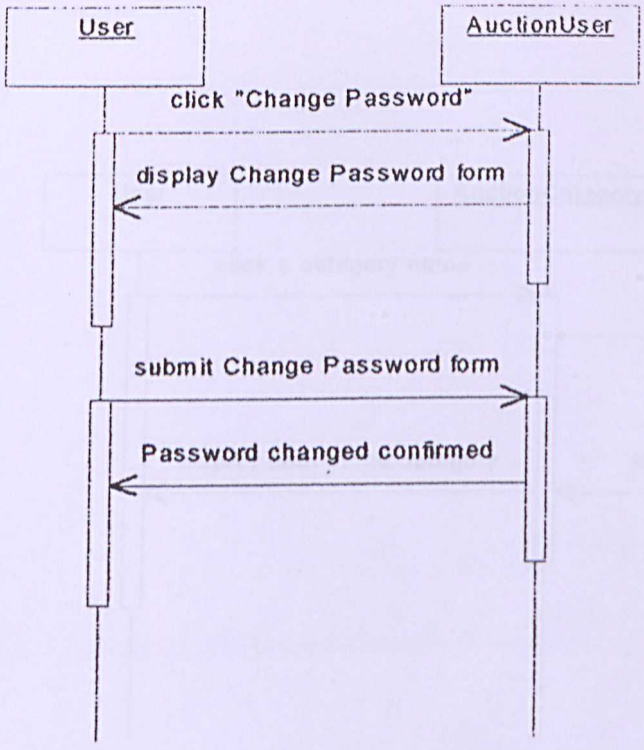


Fig 5.15 Sequence Diagram for "Change Password" Use Case

Fig 5.16 Sequence Diagram for "View Details" Use Case

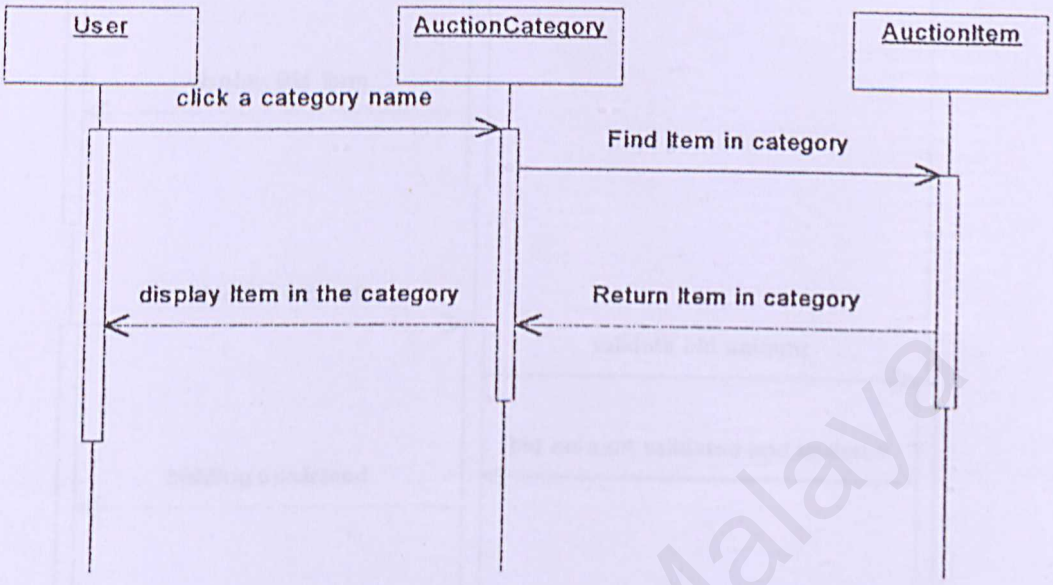


Fig 5.17 Sequence Diagram for "Select Category" Use Case

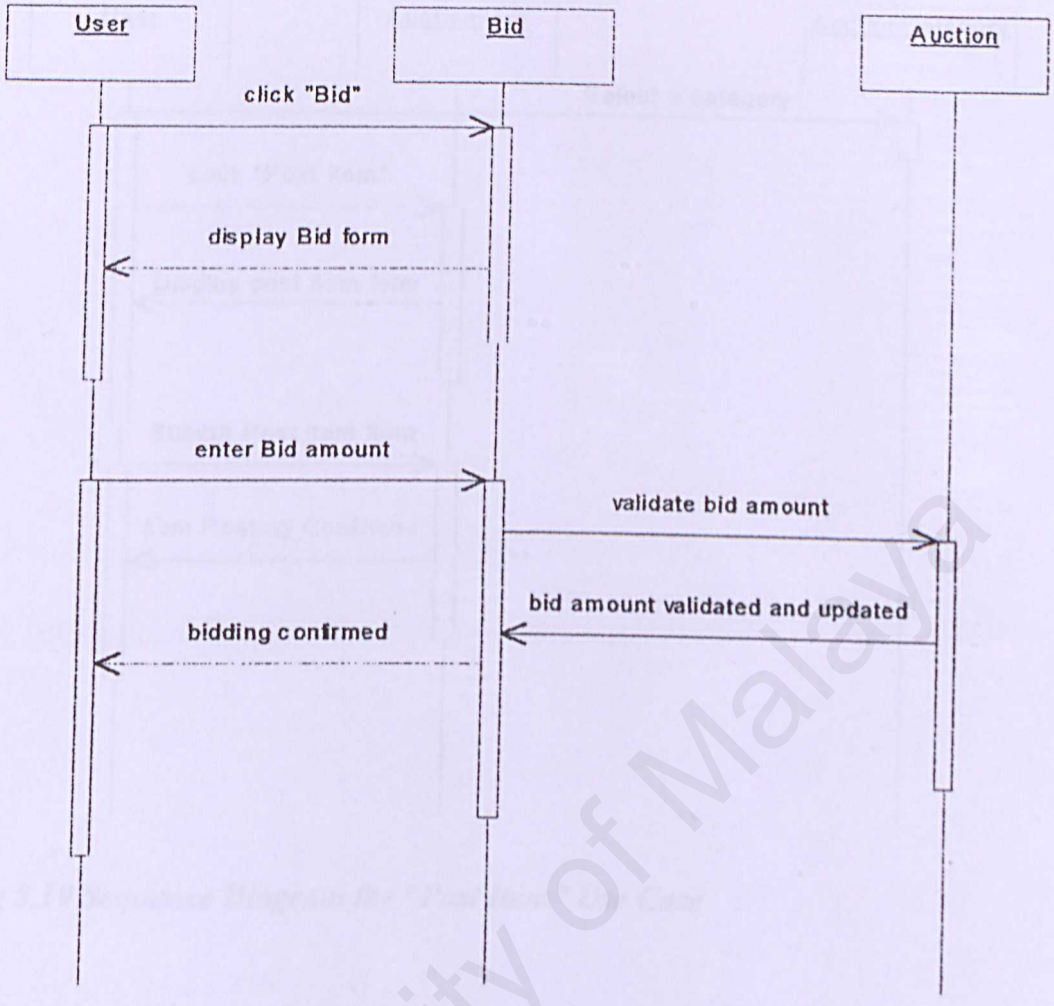


Fig 5.18 Sequence Diagram for "Bid" Use Case

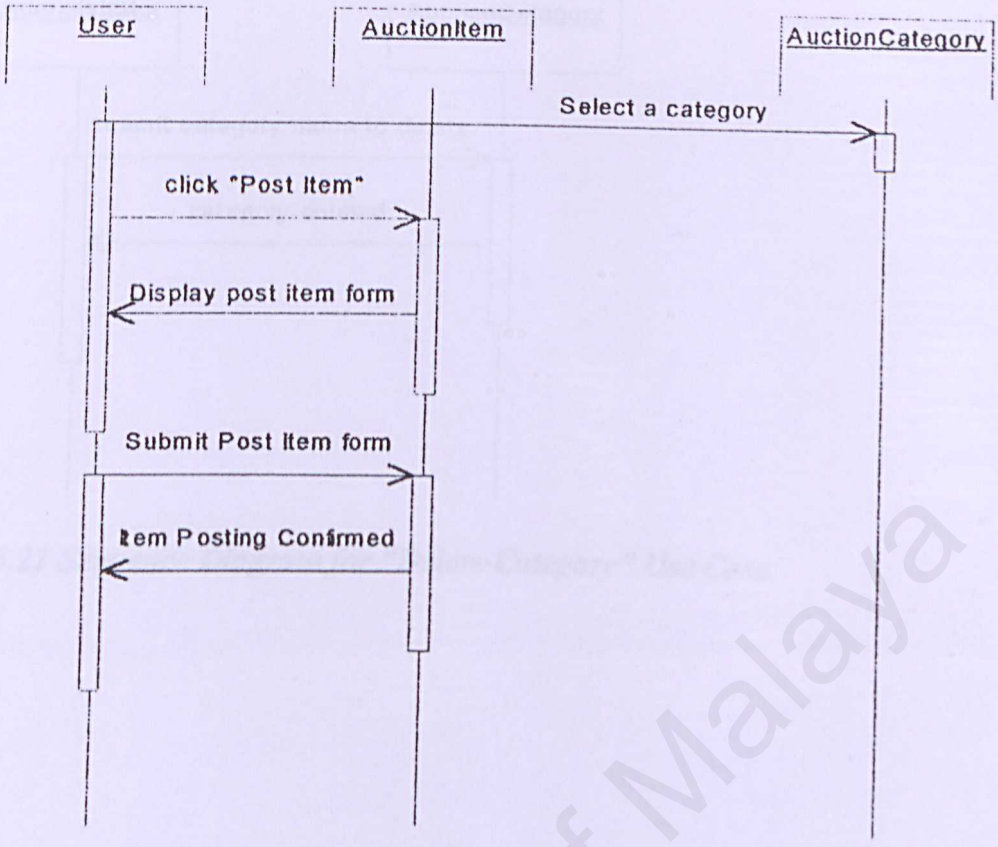


Fig 5.19 Sequence Diagram for "Post Item" Use Case

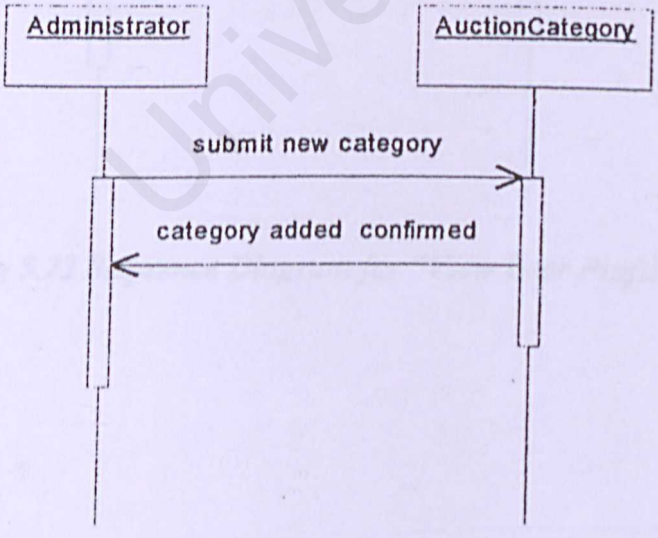


Fig 5.20 Sequence Diagram for "Add Category" Use Case

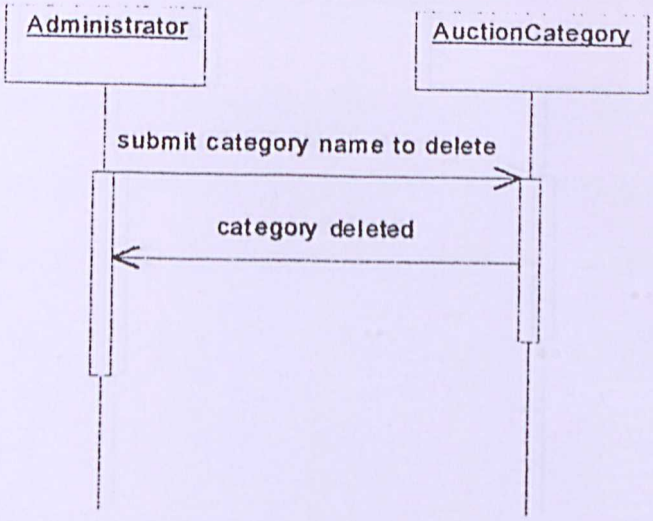


Fig 5.21 Sequence Diagram for "Delete Category" Use Case

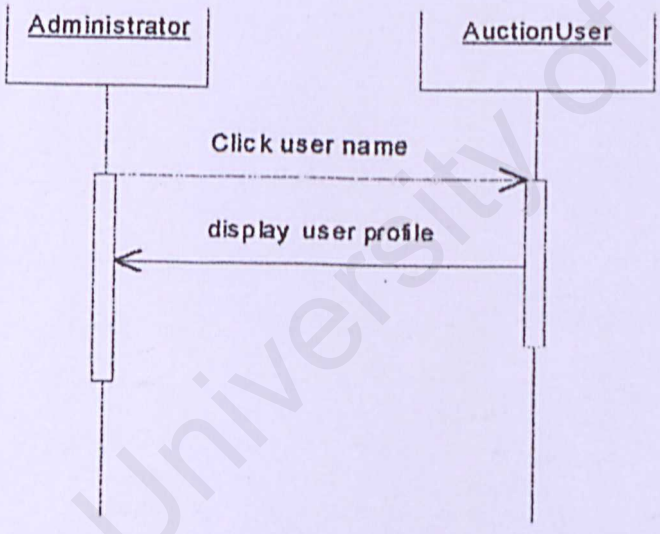


Fig 5.22 Sequence Diagram for "View User Profile" Use Case

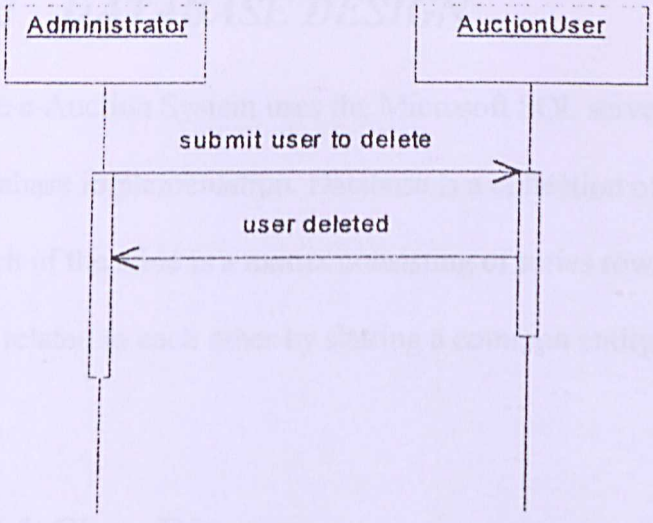


Fig 5.23 Sequence Diagram for "Delete User" Use Case

5.3 DATABASE DESIGN

The e-Auction System uses the Microsoft SQL server 2000 database model in its database implementation. Database is a collection of tables where the data are stored. Each of the table is a matrix consisting of series row/column intersections. The tables are related to each other by sharing a common entity characteristic.

5.3.1 Class Diagram

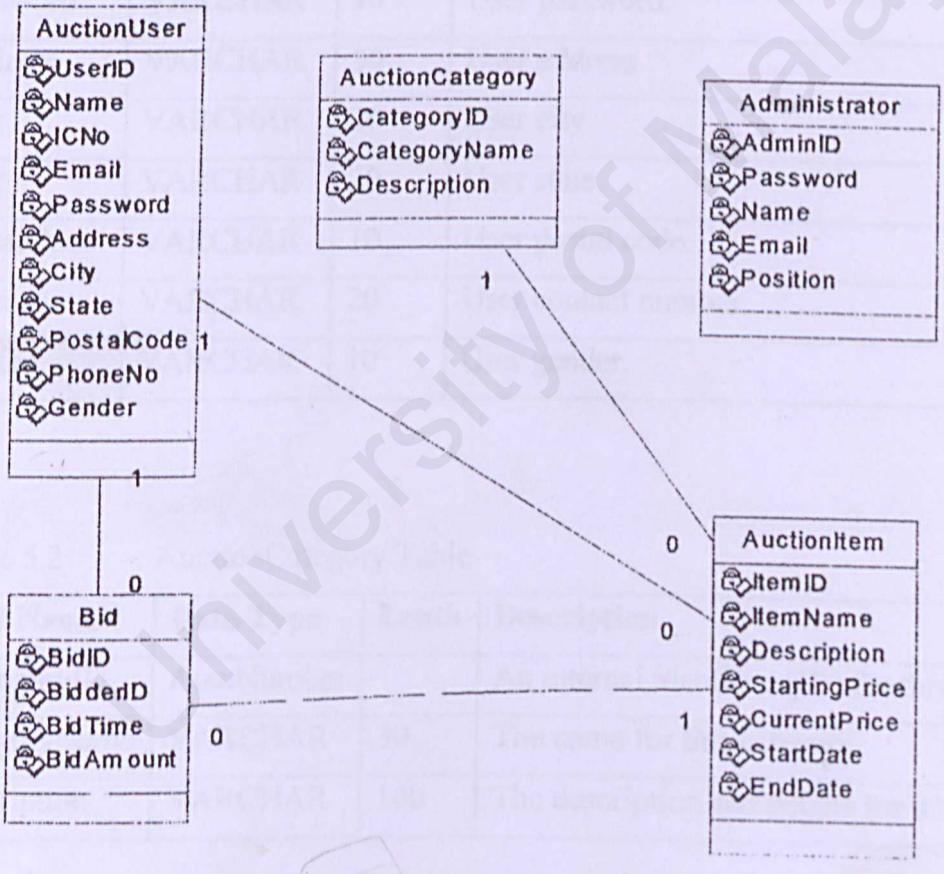


Fig 5.24 Class Diagram

5.3.2 Data Dictionary

The design of each tables of the database are described as follow:

Table 5.1 : AuctionUser Table

Field Name	Data Type	Lenth	Description
*UserID	AutoNumber		An internal identifier (ID) for the user.
Name	VARCHAR	50	User name
ICNo	VARCHAR	20	User identification card number.
Email	VARCHAR	50	User email.
Password	VARCHAR	10	User password.
Address	VARCHAR	50	User address
City	VARCHAR	20	User city
State	VARCHAR	20	User state.
PostalCode	VARCHAR	10	User postal code.
PhoneNo	VARCHAR	20	User contact number.
Gender	VARCHAR	10	User gender.

Table 5.2 : AuctionCategory Table

Field Name	Data Type	Lenth	Description
*CategoryID	AutoNumber		An internal identifier (ID) for this category.
CategoryName	VARCHAR	30	The name for this category.
Description	VARCHAR	100	The description and details for this category.

Table 5.3 : AuctionItem Table

Field Name	Type	Len	Description
*ItemID	AutoNumber		An internal identifier (ID) for the item.
ItemName	VARCHAR	20	Item name
Description	VARCHAR	50	A description for the item.
StartingPrice	FLOAT	5,2	Starting price for the item.
CurrentPrice	FLOAT	5,2	Current price for the item.
StartDate	DATE/TIME		The date and time when this item was posted.
EndDate	DATE/TIME		The date and time when the bidding stop.

Table 5.4 : Bid Table

Field Name	Type	Len	Description
*BidID	Auto Number		An internal identifier (ID) for the bid.
ItemID	Auto Number		An internal identifier (ID) for the item.
BidderID	Auto Number		The UserID of the bidder.
BidTime	DATE/TIME		The date and time when the bid was placed.
BidAmount	FLOAT	5,2	Bid price for the item.

Table 5.5 : Administrator Table

Field Name	Type	Len	Description
*AdminID	Auto Number		An internal identifier (ID) for the administrator.
Password	VARCHAR	10	Administrator password
Name	VARCHAR	50	Administrator name.
Email	VARCHAR	50	Administrator email.
Position	VARCHAR	30	Position of the administrator.

5.4.2 User Interface for e-Auction

1. **Register**

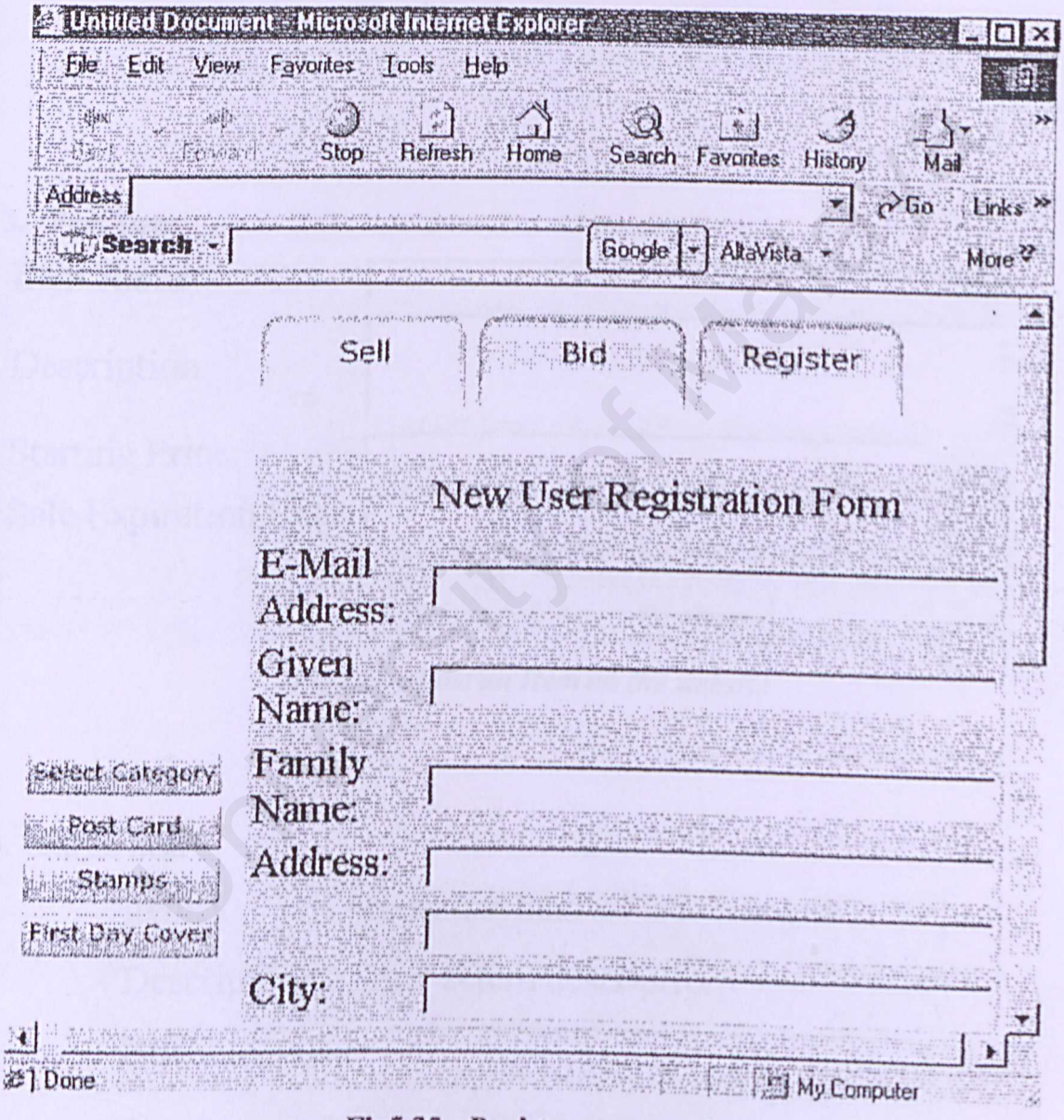


Fig5.25 : Register as a member

2. **Sign In**

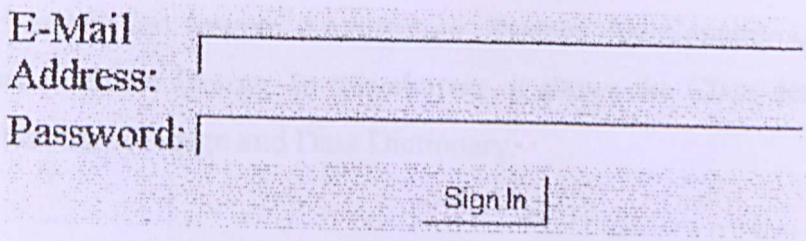


Fig5.26 : Sign In as a member

3. **Post Item**

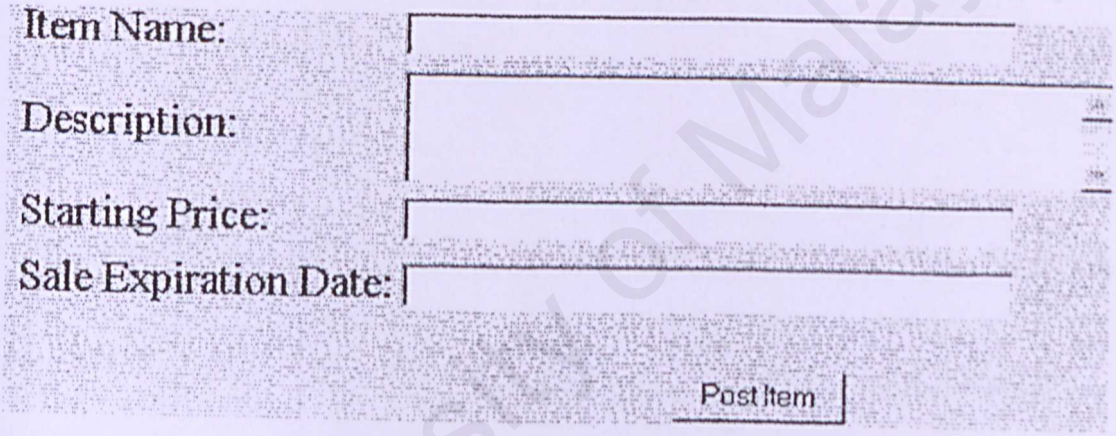


Fig5.27 : Post an Item on the website

4. **Bid on item**

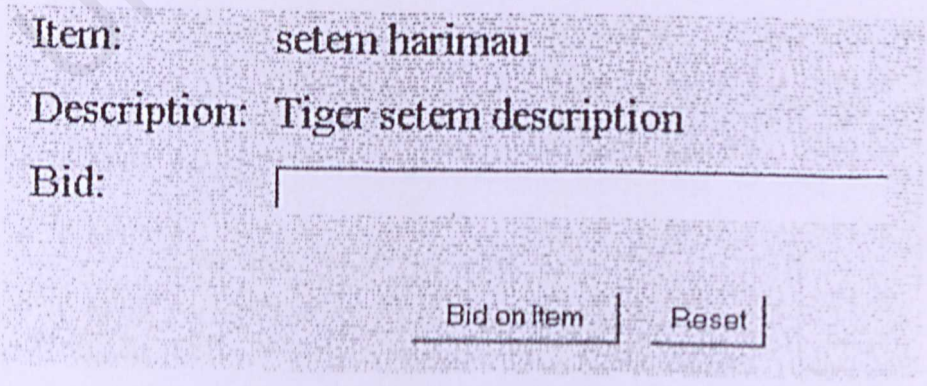


Fig5.28 : Place a bid on an item.

4.7 SUMMARY

Chapter 5 covers the System Architecture, System Functionality Design, Database Design and Interface Design. In this chapter, it shows the Class diagram, Sequence diagram, Use Case Design and Data Dictionary.

CHAPTER 6

System Implementation

System implementation is the acquisition and integration of the physical and conceptual resources that produce a working system (Meyer, Baber and Pfaffenberger, 1999). System implementation is also a nutshell in the construction of the application and the delivery of the application into the 'production phase'.

6.1 Platform Development

6.1.1 Operating System

The Microsoft platform delivered scalability and values. It enable organization to design their environment to scale up and scale out. These architecture are employed by organization to address the capacity needs of web application, database and business applications. The Microsoft response to the dynamic processing requirements demanded of today enterprise, regardless of where they happen in architecture.

As demonstrated by industry-standard benchmarks, Microsoft Windows 2000 Professional offers an demand scalability to meet the demanding requirements of commerce and enterprise application. The Microsoft platform has achieved world-class performance in the benchmark tests.

6.1.2 Web Server

Internet Information Server is an application server. In many ways, it is like a virtual operating system, because many ASP and ISAPI application executed in the process space.

Internet Information Server was an I/O thread pool to process all incoming requests. Request from static files (.htm , .html etc) are satisfied immediately, which request for dynamic content are dispatched to the appopriate ISAPI extension DLL. The Active Server Pages extension uses a worker thread pool to execute ASP pages. Because Active Server Pages is COM-based, all sorts of components end up executing in the process with the Internet Information Server.

6.1.3 Database Management System

Database is used to store information in order that information is safely kept in an efficient way. A database can be manipulated in displaying up-to-date information through the website.

The database for e-Auction system is created using Microsoft SQL Server 2000. Modification through this software is easy what more of the creation of database. To connect to the database the following source is used:

```
Provider=SQLOLEDB; Persist Security Info=False; User ID=sa;  Initial
Catalog=eAuction; Data Source=localhost;
```

6.2 Development Environment

The development environment is crucial for the rapid development of e-Auction System . The usage of dynamic and suitable hardware can help accelerating the development or construction of the system. The following sections discuss the hardware and software tools used to develop and document the entire system.

6.2.1 Actual Hardware Requirements

The hardware used to develop this system are listed below:

- Intel Pentium 3 450 MHz Processor
- 128 MB RAM
- 52X CD-ROM Drive
- 20 GB Hard Disk
- 32MB Nvidia Riva TNT2 Model 64 , 15-inch color Monitor
- Standard desktop PC components, including floppy disk drive, printer, scanner and modem

6.2.2 Actual Software Requirements

Tools Used For System Design and Report Writing

In the early development stage of system, namely the system analysis and design phase, Microsoft Word 2000 (9.0.2720) and Hardcopy are used to capture the system requirements and document ***materials, and also to print the user interface screen.***

Tools Used For System Development

The software tools used for system development are vital to the successful implementation of web-based e-Auction system. Table below lists out the software used for the development of web-based E-Auction system.

Table 6.1 Software Tools Used For System Development

Software	Usage	Description
Microsoft Windows 2000 Professional	Development Environment System Requirements	Operating system
Internet Information Server 5.0 (IIS 5.0)	Development Environment System Requirements	Web server
Microsoft Visual Interdev 6.0 / Macromedia Dreamweaver Ultradev	System Development	Code editor & interface design
Microsoft SQL Server 2000	Database Design	Database design, implementation and construction for data storage, manipulation
Microsoft Internet Explorer 5.0	System development & Interface Design	Web Browser
Adobe Photoshop 6.0	Interface Design	Artwork image files, interface graphics, and icon designing

6.3 Program Development And Coding

The coding phase is undertaken when software is to be developed or modified. During the coding phase, source codes are written and documented in some programming language to implement the program design. The program design must be translated into the form that can be understood by the machine. The code generation step performs this task. If design is performed in a detailed manner, code generation can be accomplished mechanically.

6.3.1 Designing The Program

As the e-Auction system is using ASP web technology in the development process, all the pages are written in the HTML and ASP format. Each of the files has the extension of .htm or .asp. Scripting languages can be included in the asp files, such as JavaScript , VBScript, and etc. VBScript is chosen to implement the main processing manipulation in this system. VBScript is also used to implement client-side input validation as well as developing the server-side process.

The following is the general format for the asp file used in the coding of this system.

```
<HTML>
<HEAD>
<TITLE></TITLE>

'client side scripting language with VBScript
<SCRIPT LANGUAGE = VBSCRIPT>
.....VBScript goes in here
</SCRIPT>
```

```
</HEAD>
<BODY>

'server side scripting language with VBScript (sub procedure is not allowed)
<% .....VBScript goes in here %>

'server side scripting language with VBScript (sub procedure is allowed)
<SCRIPT LANGUAGE = VBSCRIPT RUNAT = SERVER>
.....VBScript goes in here
</SCRIPT>

</BODY>
</HTML>
```

Client-Side Scripts

Client-side scripting is not directly related to ASP at all. It involves scripts writing that will be processed by the browser. When a web page source contains a client-side script, it does not attempt to process the script; instead, it simply downloads the script to the browser as part of the HTTP response, and assumes that the browser will know how to deal with it.

When the browser receives the HTTP response, it needs to process the HTML contained within, which described how it is to display the page. The browser must also take care of the client-side scripts that were download as part of the page.

Server-Side Scripts

A script that is interpreted by the web server is called a server-side script. A server-side script is an instruction set that is processed by the server, and which generates HTML. The resulting HTML is sent as part of the HTTP response to the browser.

VBScript

VBScript brings active scripting to a web variety of environments, including web client scripting in Internet Explorer and web server scripting in Internet Information Server (IIS). VBScript is said to be a glue that holds web browser and web server component together.

VBScript itself is not able to open or modify any files on the user's computer. It will not cause the computer to crash. If an important exchange of information is happening in web page, the user would certainly not want the computer to crash because of an ill-format script.

Moreover, VBScript is much easier to learn than programming language such as Java, C/C++ and other scripting language. Derived from the BASIC language, VBScript should not be difficult for anyone who has any computer program experience.

6.3.2 Coding Approach

Generally, there are three major approaches applied in coding methodology, which are Top-Down approach, Bottom-Up approach, and Threads approach.

Top-down Approach

High-level modules are coded, tested, and integrated before higher-level modules.

Bottom-up Approach

Low-level modules are coded, tested, and integrated before higher-level modules.

Threads

A decision is first made on the order in which program functions should be implemented. The modules that support each function are then determined, and each set is then implemented in decreasing order of functional importance.

The advantage of this strategy is that the most important functions are implemented first.

6.3.3 Style Adopted

Regardless of the type of coding approaches chosen, program code is written whenever is possible, according to the structured programming conventions. These conventions confine the overall coding style to the basic control structures.

Branching Statements that perform a test and then execute some lines of code but not others. Among the main techniques for branching that have been using in the e-Auction code execution are: If…Then and Select…Case.

Looping Statements that execute a set of code again and again. Two types of looping structures have been using so far. They are the Do…While and For…Next.

Jumping Statements that pause the execution of the current code, jump over to another set of code, and then return. In this case, ASP is needed to jump away from execution of the main body of the code, run through the commands of a particular functions or sub-procedures, before returning to execute the main body of the code.

6.3.4 Coding Principles

Several principles are applied during the development of the system to ensure that the quality and proper structure in the code generated. These principles include the following:

Readability

It is very important when it comes to the future enhancement of the system by other people. Code should be easily read and understood. To achieve this, comments can be used to explain the module or code. Meaningful variables and labels will also be helpful in reading the code.

Maintainability

Code should be to read, corrected and revised. Codes that perform functions for one module should be grouped together and try as much as possible to achieve high cohesion and loose coupling.

Robustness

Code should be robust in terms of handling errors and responding by displaying appropriate error messages and try to avoid system failure. The e-Auction System is

developed using the event driven approach which means that codes are executed with respond to provocation of certain events such as mouse click.

6.4 Chapter Summary

This chapter basically is all about the System Implementation. It covers the Platform Development, Development Environment and Program Development And Coding. It includes the platform that has been used to develop the system.

The Platform Development includes the Operating System, Web Server and Database Management System that have been used during development of the system. The Development Environment including Actual Hardware Requirements and the Actual Software Requirements. The Program Development And Coding parts include the Coding approach, Coding Strategies, Coding format and Coding principles.

CHAPTER 7

Testing

7.1 Introduction

Software testing is a critical phase of its quality control and assurance. Testing represents the complete and extensive review and challenge on the application design, specifications and codes. During the testing phase, developed program is being tested to determine whether it meets the ordinary requirements. Through various types of testing, the developing program design errors or program coding errors can be identified.

Testing should be done during the software phase, to debug design-time errors. It is then continued during the system integration phase, to uncover run-time bugs. The main difference between testing modules during the development phase and testing them during the system integration phase is that errors can be fixed as they are found during the development phase. The errors during the integration phase should be systematically recorded, and the module with bugs found must be returned to its developing programmer(s) for further fixing and debugging procedures.

Generally, the process of testing usually can be concluded into seven steps, as below:

- Select the boundaries of the test: testing can focus on an individual module in a program , several modules, or the entire program.
- Determine the goal of the test: testing can be used to identify unauthorized, inaccurate, incomplete, ineffective, or inefficient code. A particular test should focus

on only one (or a small number) of goals- for example, the performance of the program under the load stress.

- Choose the testing approach: Several testing approaches have been developed and are now widely used- for example, black-box testing and white-box testing.
- Develop the test: test data or test scenarios must be developed to accomplish the goals of the test. In particular, the expected results of the test must be determined.
- Conduct the test: the conduct of the test can involve, for example, executing test data through a program or performing a hand-simulation of the program's execution pattern under test scenarios.
- Evaluate the test result: the actual result obtained under the test must be compared against the expected results. The nature of any discrepancies identified must be determined.
- Document the test: All steps in the testing process must be documented.

7.2 Unit Testing

Unit testing focuses on evaluating individual modules within a program. This is the basic testing necessity for any software. For system developed with Active Sever Pages(ASP), the unit testing involved tends to be undertaken for individual modules which constitute substantive pieces of work like e-Auction System, which consist of two major modules: user area and administration module.

For this e-Auction system, two major types of unit tests are being undertaken. The first type, static analysis tests, evaluates the quality of a module through a direct examination of source code. The module is not executed on a machine, although it might be executed

in mind. There are three main types of static analysis tests. They are desk checking, structured walk-through, and designs and code inspection.

Desk checking is adopted in unit testing of e-Auction System. Desk checking which involves the module's code is examined for evidence of errors or irregularities. Throughout this checking, several errors and bugs have been identified, including checking for the syntax errors, logic errors, deviations from coding standards or fraudulent code. After the source codes of each module is completed, reviewed, and verified for correct programming syntax, unit testing cases are then designed to challenge its strengths and to ensure it will operate as intended by programmer.

7.3 Integration Testing

After all individual components, objects and modules have passed through each correspoding unit test, it is appropriate time to conduct the integration testing. This testing focuses on evaluating groups of program modules primarily to identify whether the system interfaces are defected, and overall, whether they fail to meet the requirement specifications. In this case, e-Auction system is no different. Similarly, e-Auction system with integrated modules have to go through integration testing to ensure valid linking and dynamic relationships either between modules of the entire system, or even among sub-modules in each individual module. This will help to identify and ensure the interaction between the specific features and interfaces of the two involved modules.

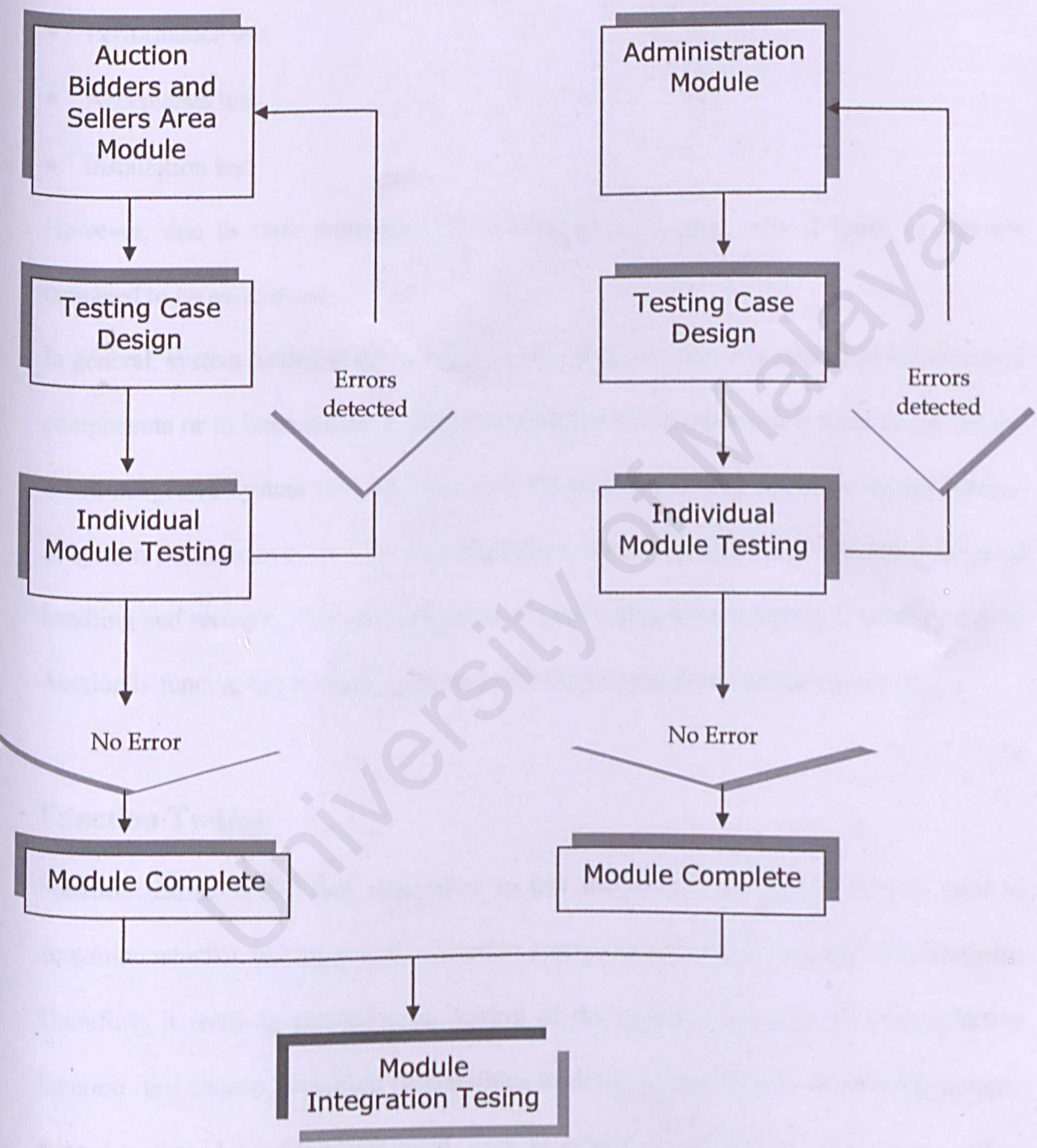
Two different strategies can be used to undertake integration testing: the big-bang testing and the incremental testings. In this e-Auction system testing, incremental testing was adopted. Through this incremental testing, subsets of modules (sub-modules) are

assembled iteratively and tested until the entire program is finally ready. The reason of applying incremental testing approach rather than choosing big-bang testing is because it has been foreseen that this strategy is much more consistent and explicit to be held, in the sense that all individual modules are well coded, tested individually, and then assembled in total to perform the integration testings.

As for the testing approaches, it normally includes top-down test, bottom-up test, and hybrid test. To ensure that this web-based application coding and design can be carefully tested, hybrid approach is chosen to be adopted. This involves the combination of both top-down and bottom-up tests.

In particular, the specific testings that have been conducted during this phase are: the checking of variables passing, parameters passing of functions, and event procedure calls, inter-module variables and control values passing. Besides, record manipulation and traversing processes are also explicitly tested. All Structred Query Language(SQL) commands are tested through the developed system and validated through execution.

Fig7.1 : Flow Chart of Unit Testing Stage towards Integration Testing Stage for e-Auction System



7.4 System Testing

There are four types of system tests that might be carried out.

- Funtion test
- Performance test
- Acceptance test
- Installation test

However, due to time constraint of this e-Auction project, only 2 types of test are managed to be carried out.

In general, system testing is designed to reveal bugs , not possibly attributed to individual components or to interactions betweem component and modules. It is carried out on the entire integrated system as one whole unit. Overall, the testing activities include testing of system performance, security, configuration sensitivity, usability, data integrity error handling and recovery. The main purpose of conducting system testing is toverify that e-Auction is functioning properly ,and meet the design and development objectives.

Function Testing

Function testing is the first step taken to test the system of e-Auction. It is used to determine whether the integrated e-Auction system have fulfilled its initial requirements. Therefore, it tends to emphsize on testing of the system functionalities. An effective function test should have high probabilities to detect system flaws. As for this system, several testings have been employed, such as checking and testing all valid as well as invalid input data types, ensure the including of stoppng criteria, foresee the expected output resulting from certain actions in the functions.

Performance Testing

Performance testing addresses the non-functional requirements of e-Auction system after the function testing has been completely carried out. System performance is measured by applying performance objectives set by several potential users, as drawn out in the non-functional requirements section defined initially in the early planning stage.

In the case of e-Auction system, performance testing inspects how effecive the data manipulations are being carried out. It also test out the query speeds, which involves the record retrival, searching and sorting processes. The speed of data loading from the SQL server database is also taken into consideration.

7.5 Chapter Summary

This chapter is mainly about the testin that has been doned to the system. It includes the Unit Testing, Integration Testing and the System Testing. Unit testing focuses on evaluating individual modules within a program.

The integration testing focuses on evaluating groups of program modules primarily to identify whether the system interfaces are defected, and overall, whether they fail to meet the requirement specifications. While the system testing is designed to reveal bugs. There are only two types of system testing has been done due to time constraints.

CHAPTER 8

System Evaluation

The last chapter includes problems encountered during the development phase of the e-Auction system and its solutions.

8.1 Problems Encountered And Solutions

As this project has to be done within a short span of time and a lot of technical issues need to be resolved, a lot of problems have been encountered. Solutions have been sought during testing and reference check with course mates. Encountering with these problems has been proven to be a valuable learning experience.

Problems And Solutions During System Studies And Analysis

During the system studies and analysis phase, a lot of studies have been carried out. Lack of knowledge in the web application has been a great obstruction.

Difficulty in Choosing A Programming Language

There are many programming languages available in the market, which can be used to develop a web application. To determine which approach to use, seeking advises and views from project supervisor and course mates engaging in similar project are carried out. After much references, studies and surveys, VBScript and ASP are chosen prior to the short time span available to develop this e-Auction System. Therefore, VBScript and ASP will be the most suitable language as it incurs shorter learning curves.

Determining Project Scope

As this involves developing a e-Auction system for real user, to build a full-fledged system is merely impossible within the given time frame. Inexperience with the current

technologies and particular scripting language is another hindrance to implement true workable e-Auction system for commercial use.

Problems And Solutions During System Implementation & Testing

The problem faced during the initial project studies and analysis, were not as crucial compared to the problems faced during implementation and testing period. There are a number of unexpected problems arise during these phases, as described below:

Lack of Mastery In Web-based Programming

As there is no prior mastery and knowledge in programming within a web-based environment, a lot of studies need to be done. New programming languages like VBScript, ASP and Javascript need to be learnt within a short time span. Besides, programming concepts for web application is quite different from the traditional way of programming. However, all these obstacles are resolved through discussions with course mates, supervision form project supervisor and self-studies.

8.2 System Strengths

Simple of Use

This e-Auction system is very easy to use. Users can learn how to use this system very fast. It is easy to understand. The simplicity of this system will enable users to perform their tasks easily.

User Friendliness

This system has user friendly interface that will tell the users how to work with this system. The system is developed based on the event-driven programming. Users have the controls of the system function flow by just click on the button. It incorporates a standard homepage with a consistent environment. Moreover, the background colour is set to be the same to make it standard. This user friendly interface will shorten the learning curve of the users.

Password and Privilege Protected Site

This system is a password-protected site. By giving authorized user ID and password, unauthorized users are prohibited from accessing his or her records stored in the database. This also prevents intruders from intentionally or unintentionally causing vast damages to the system.

Besides, those who access the system with the privilege of an "administrator" will have the privilege to view the entire site, including both the administration and user section. In contrast, those who access the system with only privilege of an "User", will only be allowed to browse through and use the provided functions in certain user-related section, like "Add Item" and "Edit Profile" . Whenever a current user with "User" privilege accidentally click on any of the "Administrator" protected page, he/she will automatically be redirected to the initial login page. This is to avoid non-administrators to simply change various important information like personal data, without the permission and acknowledgement of any authorized adinistrator.

Reliable System With Effective Error Handling and Recovery

This system is a reliable one as it caters for almost all possible errors encountered. Input by user is validated and verified. For example, a blank entry of required data input or an invalid datatype will be handled by the system by prompting out an error message to inform the user about the error. At the same time, the system would recover from the error and continues to be used.

Relatively Fast Response In Document Retrieval from Server

Each web page is designed to be lightweight. These pages load in a reasonable amount of time to ensure users need not wait too long to view the pages. Heavy graphics and background images are avoided.

Auto-Creatable Database Records for Newly Authorized User

The database of e-Auction system is totally expandable. Since there is a need to provide a personal data profile for every user who is authorized to use the system, the system is

designed in such a way that it can automatically identify any newly registered user and instantly create a new record particularly for his/her access, to manipulate his/her personal events.

System Transparency

System transparency refers to the condition where the users do not need to know where the database resides, how the system structure is, its database management system and anything related to the building of the system. For example, the information retrieval and downloading of records are similar to a system accessing the local database. This is to ensure not to confuse users especially users in retrieving information.

8.3 System Constraints

As in other system, there are also several constraints and limitations in the e-Auction System. These limitations can be addressed in future development and system enhancements.

Browser Limitations

This e-Auction System requires a VBScript support browser for execution at present. User using browser that do not support these features will not be able to use the available functions in the system.

Limited Functionality

This e-Auction System only allows users to do Add Item, View and Bid function in User section only. However, due to time constraints, the system do not allow them to search item in the user section.

Email Facilities Not Integrated

The email server is not integrated. If the administrator want to reply to users, he/she will have to use other mail facilities, like Microsoft Outlook Express in this case. The message sent cannot be stored in the database.

Report Function Not Integrated

e-Auction system has not provided administrator the ability to print query results or other data output like their total users registered and others directly from its application.

8.4 Future Enhancements

System development has no boundaries as new requirements and better implementation methods continue to arise and evolve. There are several enhancements that could extend the usability of the current version of e-Auction system, in terms of functionalities and featurers of the developed system in near future.

Interactive & Context-Sensitive Help

Currently, this system does not provide any help function. In future, a help module should be integrated into this system and be an interactive and context-sensitive help so that user seeking help can access the relevant information quickly.

Support Various Types of Popular Browser

As mentioned above, this system requires Internet Explorer and above for execution. In future this system can be fine tuned to fulfill other browser requirements such as Netscape Navigator for execution. This is because Netscape has a sizable share in the browser market besides Internet Explorer.

Integrate With Mailing Capabilities

The current system is not completed with a mail server service. In future a mail server can be incorporated into this system where is allows the administrator to maintain and synchronize the bid events with users through the administrator module. With this mailing capability, every user can be reached, by the administrator.

8.5 Knowledge And Experience Gained

There have been many types of approach and programming skills learned during the planning, designing, and implementation of this project. Various coding, testing and conversion techniques also being exposed.

During the development cycle of this project, various new programming skills were learned. Even the existing programming skills have also been polished. Among those gained programming languages learned are Javascript and VBScipt. New web technology such as Active Server Pages, and Java Applet were also learned and exposed. These supporting development tools, such as Microsoft Visual InterDev, Macromedia Dreamweaver UltraDev and so on were also being mastered.

It can be said that it is really a great opportunity and challenge for any student who has passed through the system production procedures. Students have the opportunity to plan, scope,develop, setup, deploy and finally execute a real application system with hand-in or practical experience.

8.6 Reviews On Goal

Generally, all the objectives of the e-Auction system are achieved. However, certain use cases developed are not as perfect as I expected because of time constraints. The users reviews showed that the system is indeed user friendly and will be able to drives all levels of users online. Besides, the system is reliable and the response time is fast.

8.7 Chapter Summary

The system evaluation chapter is mainly about Problems Encountered And Solutions while building the system. It also including the System Strengths, System Constraints, Future Enhancements for the system.

Apart from that the Knowledge And Experience Gained while buildin the system and Reviews On Goal will also be covered. As the last chapter, this system is a total review and evaluation of the e-Auction system.

User Manual

Hardware Minimum Requirement:

- Celeron 400 MHz processor
- 64 MB RAM of memory
- 1 GB of hard disk space

Software Minimum Requirement:

- Windows 2000 Professional
- IIS 5.0
- SQL Server 2000

Getting Started:

1. Type "http://localhost/eAuction/" in the address box of browser.

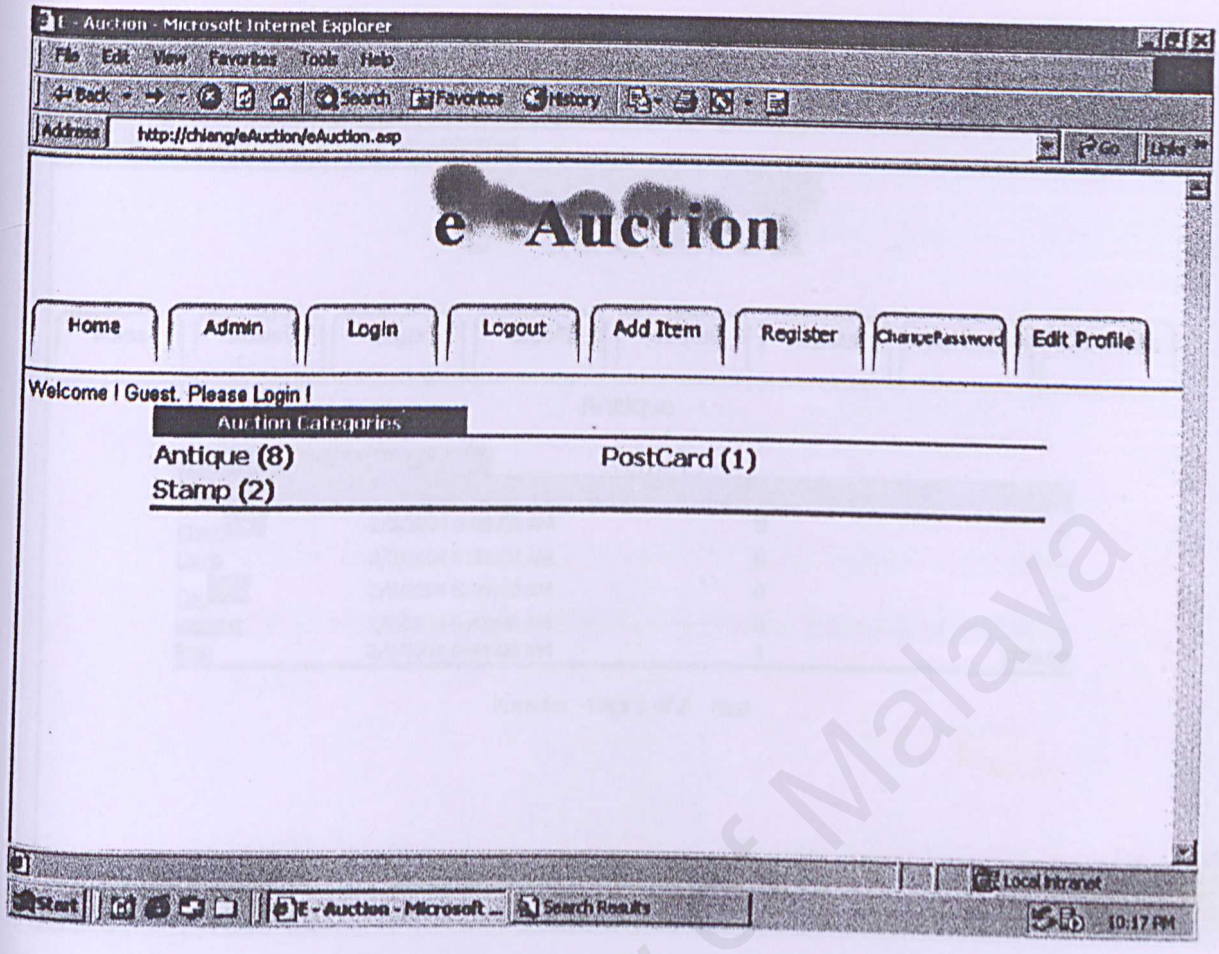
2. There are two possibility if the site could not be access.

-Software not compatible (No Webserver).

-The site has not been saved in the correct directory.

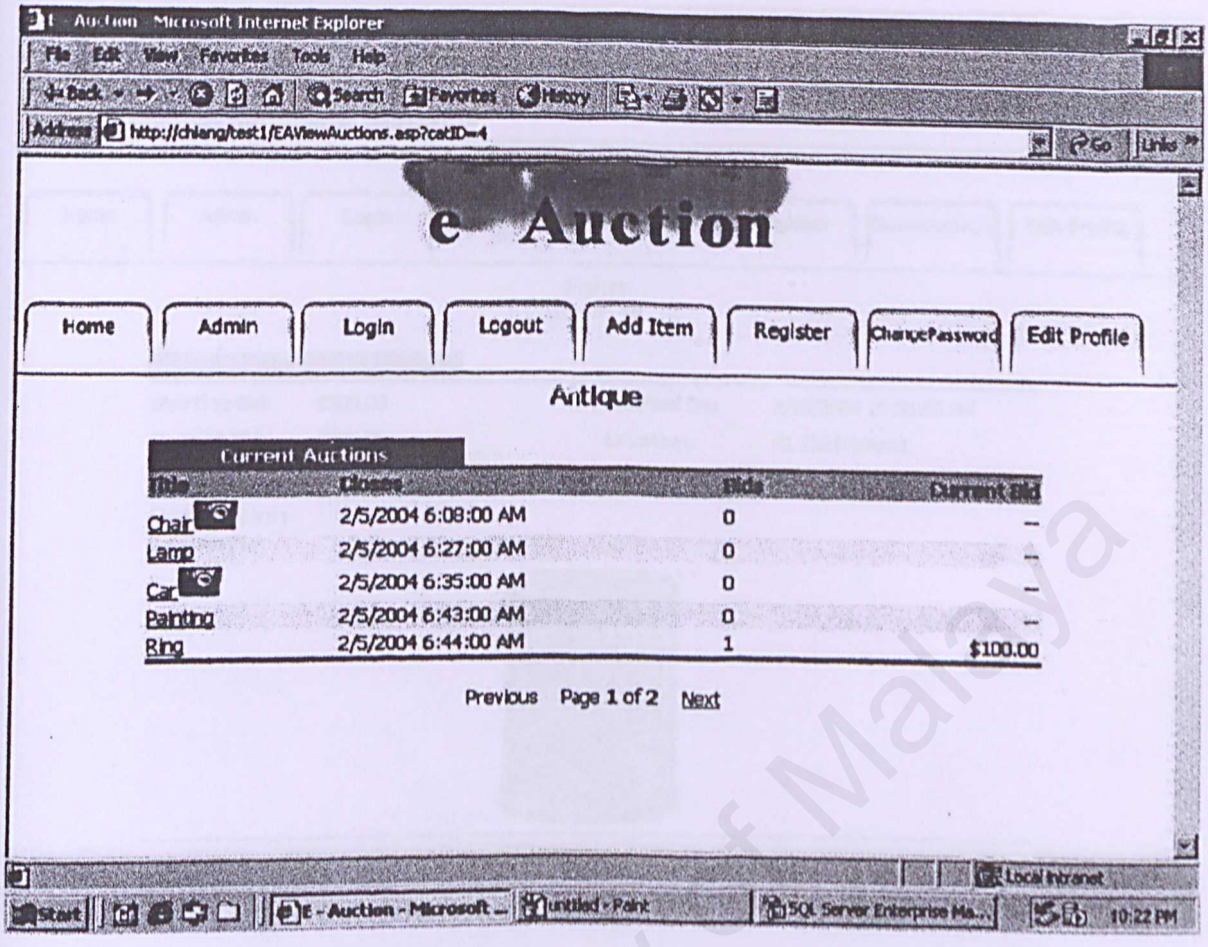
Should be saved in " C:\ Inetpub \ wwwroot \ eAuction \"

Main Page :



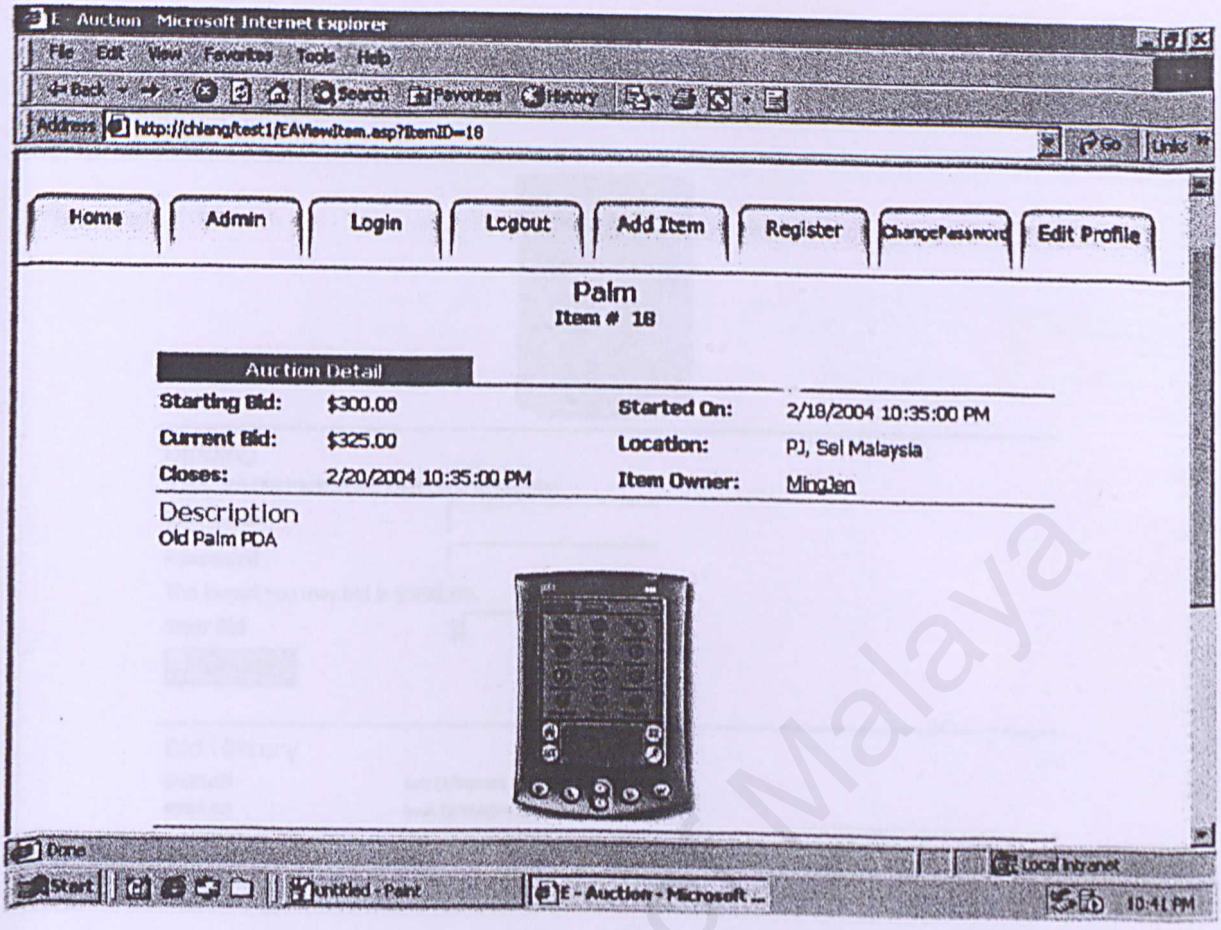
When the user successfully access the website, the main menu appears. The user will have a few options as seen on the main page. The user can browse the category shown or click on the Categories to look for the item that interested them.

Choose Category :



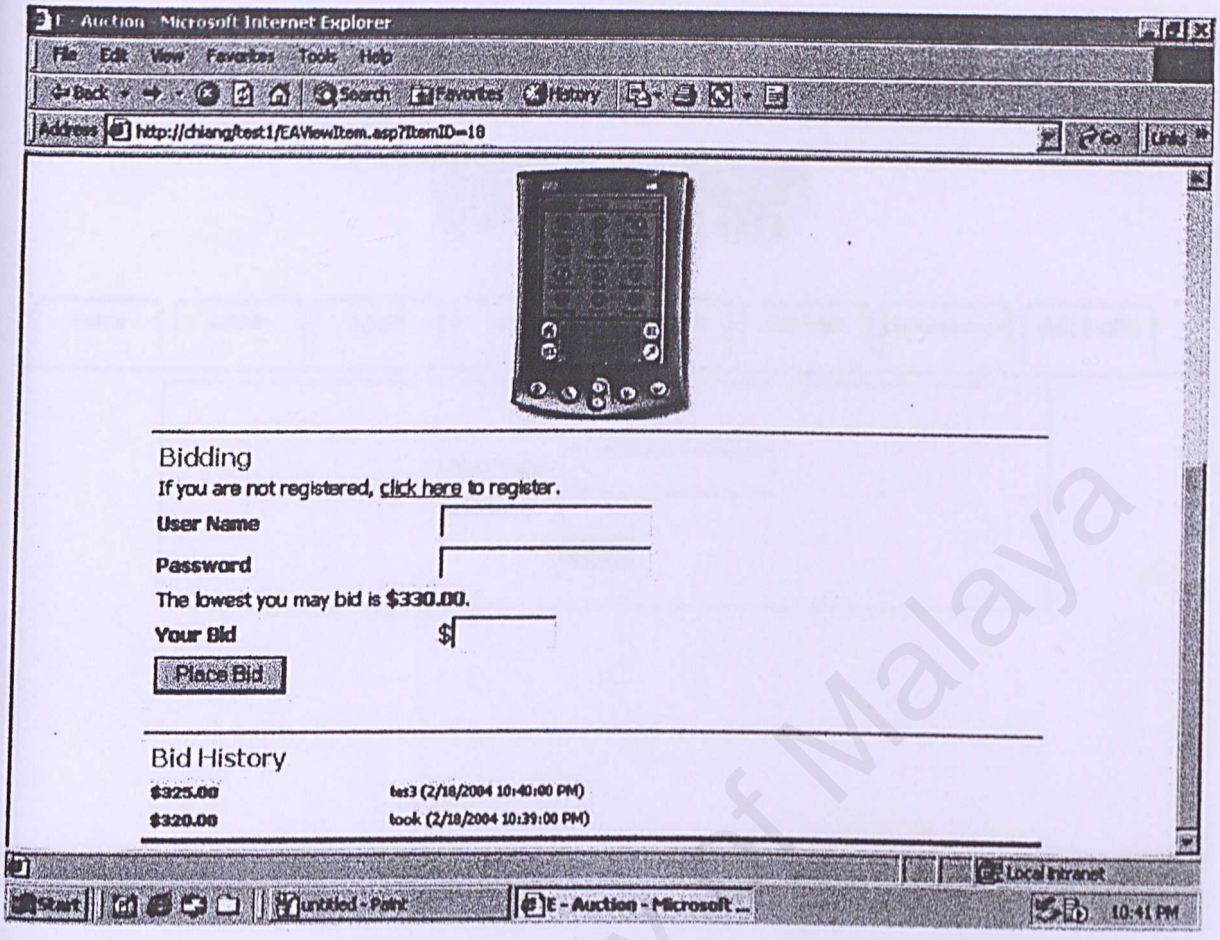
When the user click the Category name, the item under the Category will be shown with the details like Title, Closing Date, Bids, and Current Bids. From there the user can make their decision to click on the item that they are interested in to see the details description of the item. The camera icon show that the item picture had been uploaded.

Choose Item :



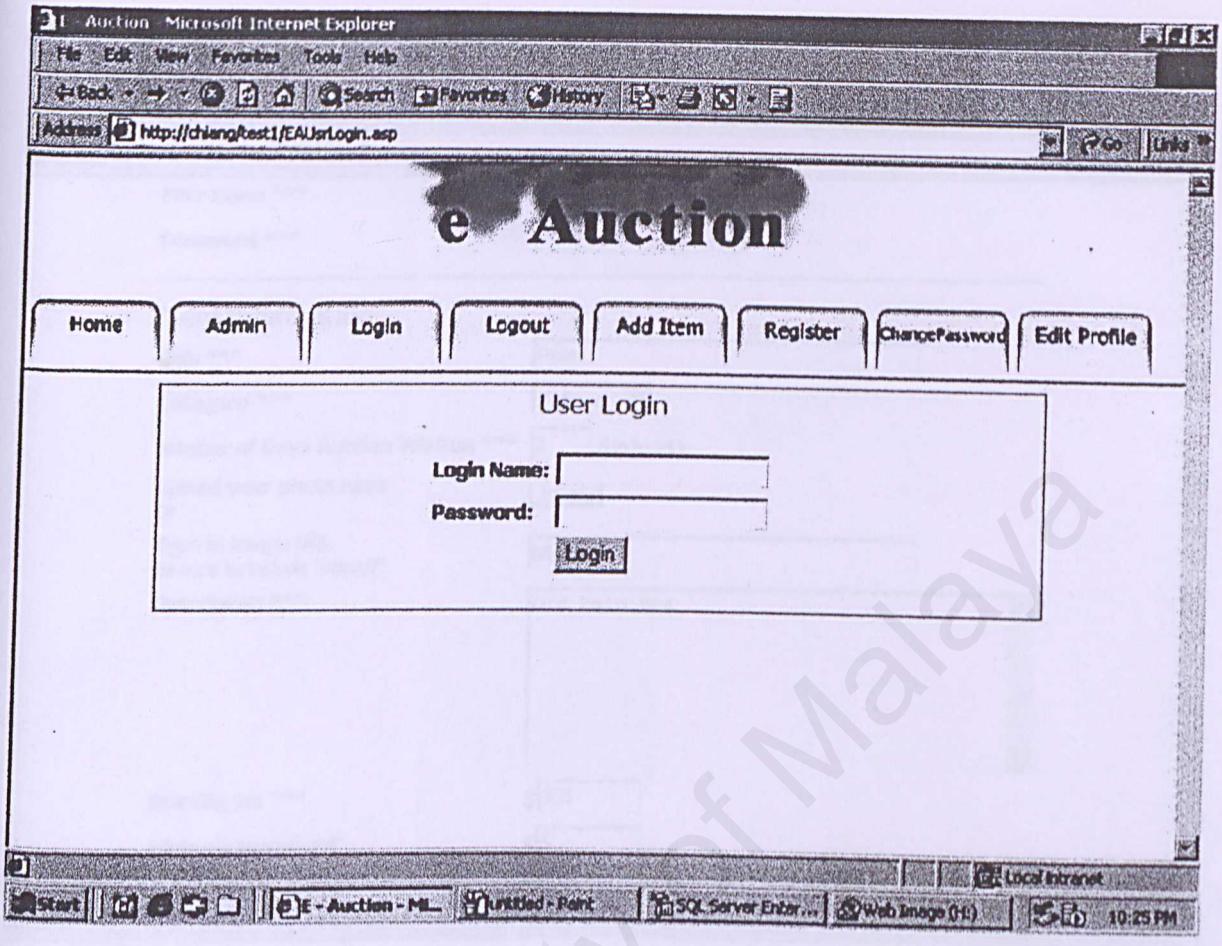
The Item Page appears when the user click on the item name. This is the page for the user to know more details about that particular item. Then, the user can decide whether to bid on that item or not.

Bid:



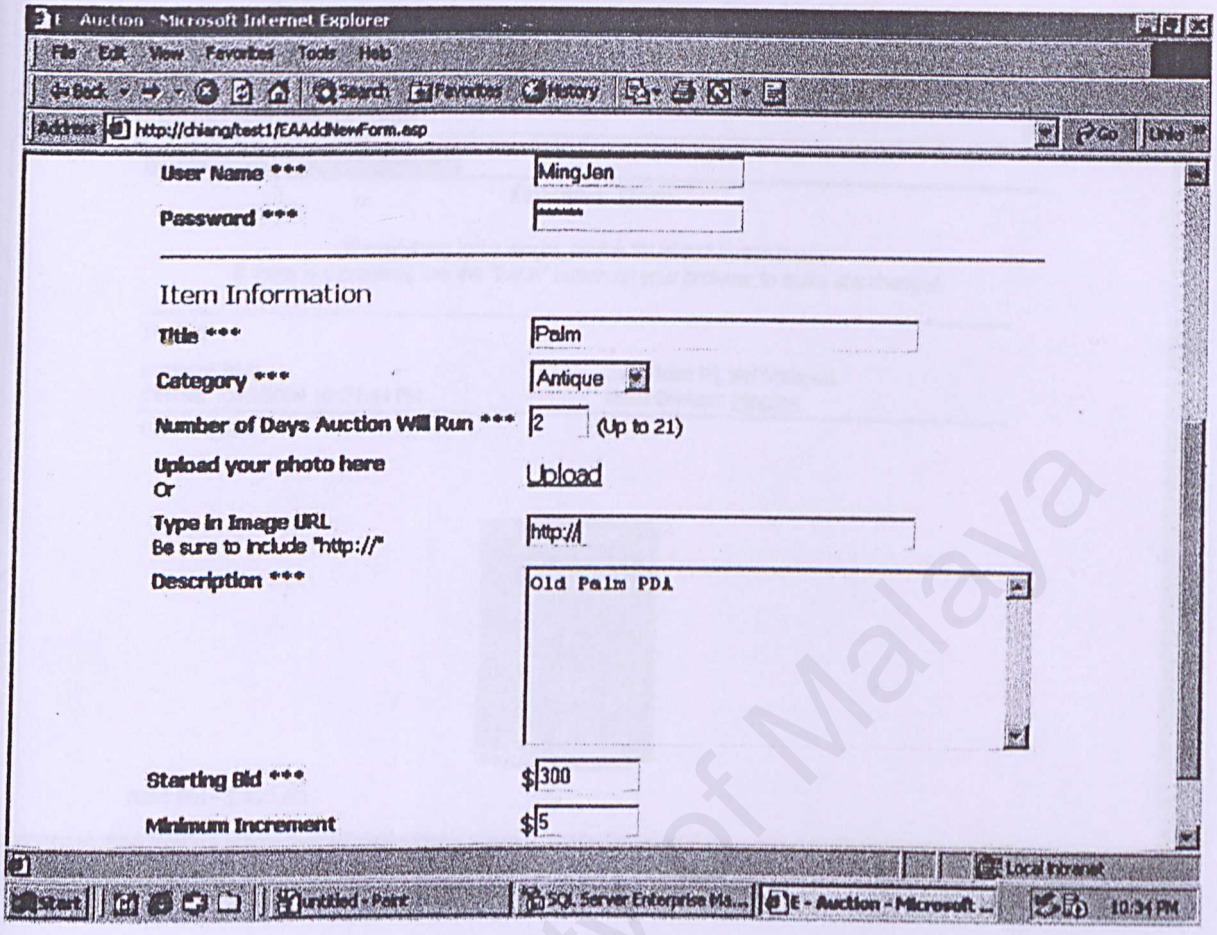
The user can the bid on the item that interest them by key in their User name, Password and the money that they are willing to pay for that item. Then, they can submit their bid by click on the "Place Bid" button. The bidding activities will be shown below as a "Bid History". The User Name and the Password must be matched. If not an error message will be shown.

Login :



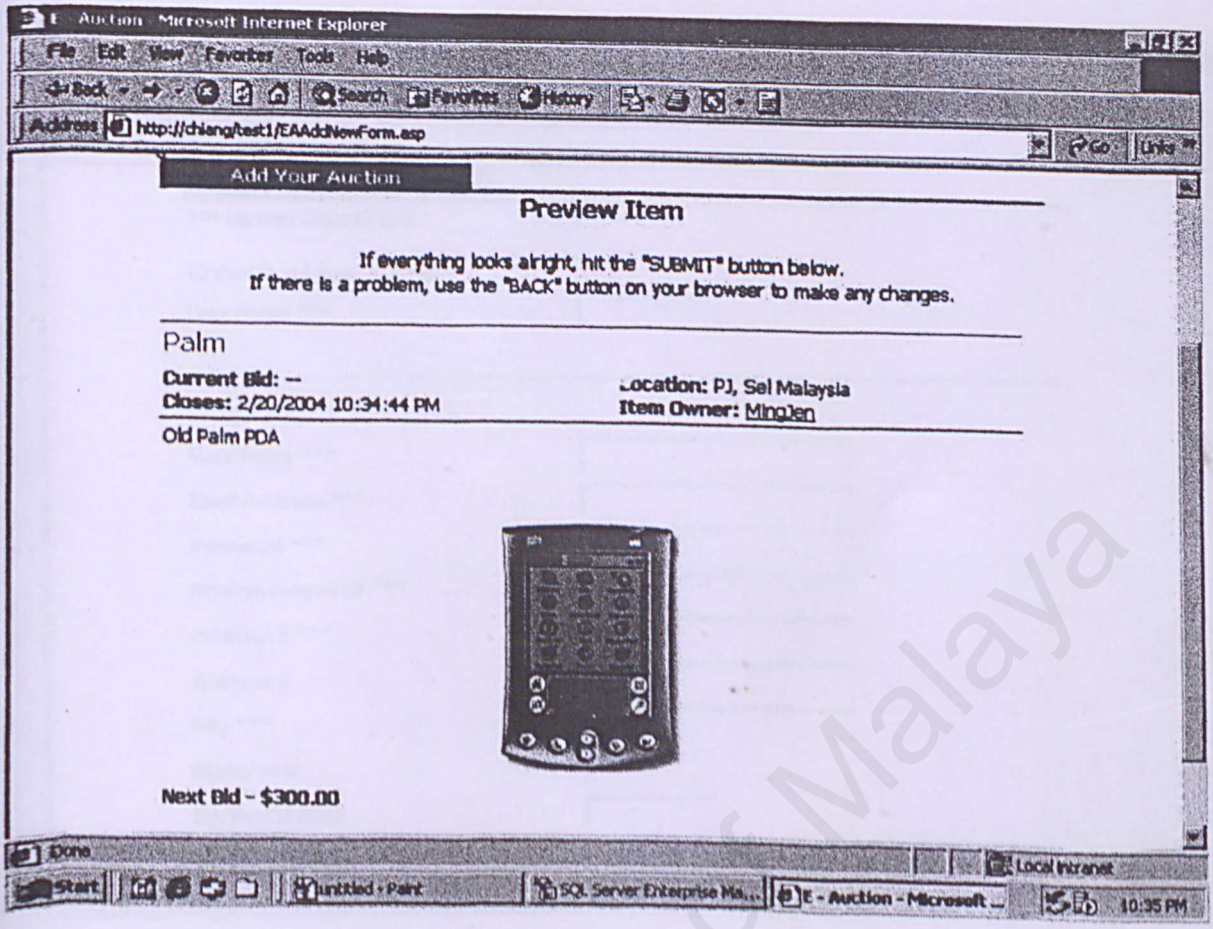
When the user click the "Login" from the main menu, this page will be shown. If the user has already registered, they can key in their login name and password in order to perform some user management task like "Add Item" and " Edit Profile".

Add Item :



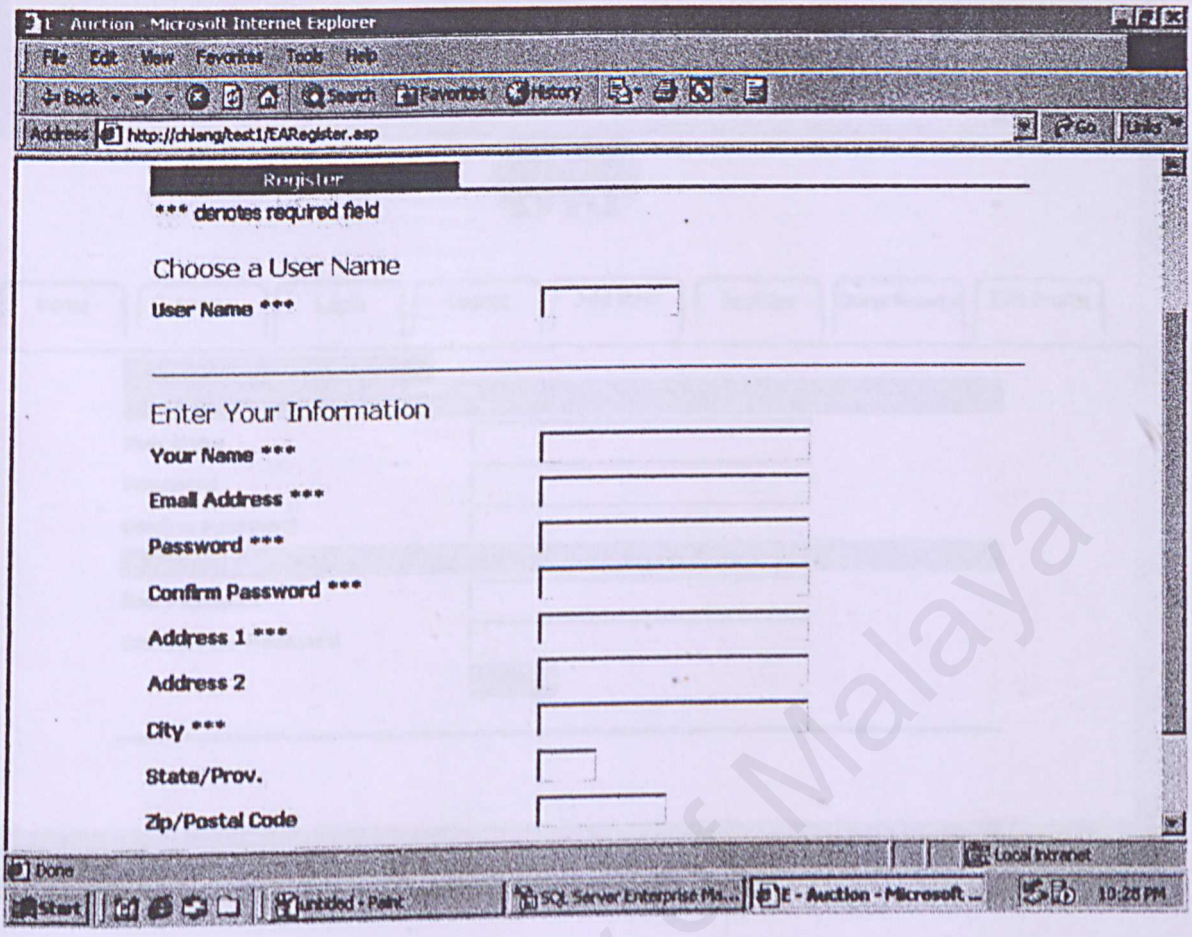
After login, then click on the "Add Item" link, this page will appear. The user can add some item that they want to sell here. The user must login before they can access this page. If not, they will be prompt to login by showing them the "Login" page. They have to reenter their User Name and Password to show their seriousness about adding item. The user can key in the relevant details about the item and upload the item's photo as well by click on the upload link.

Preview :



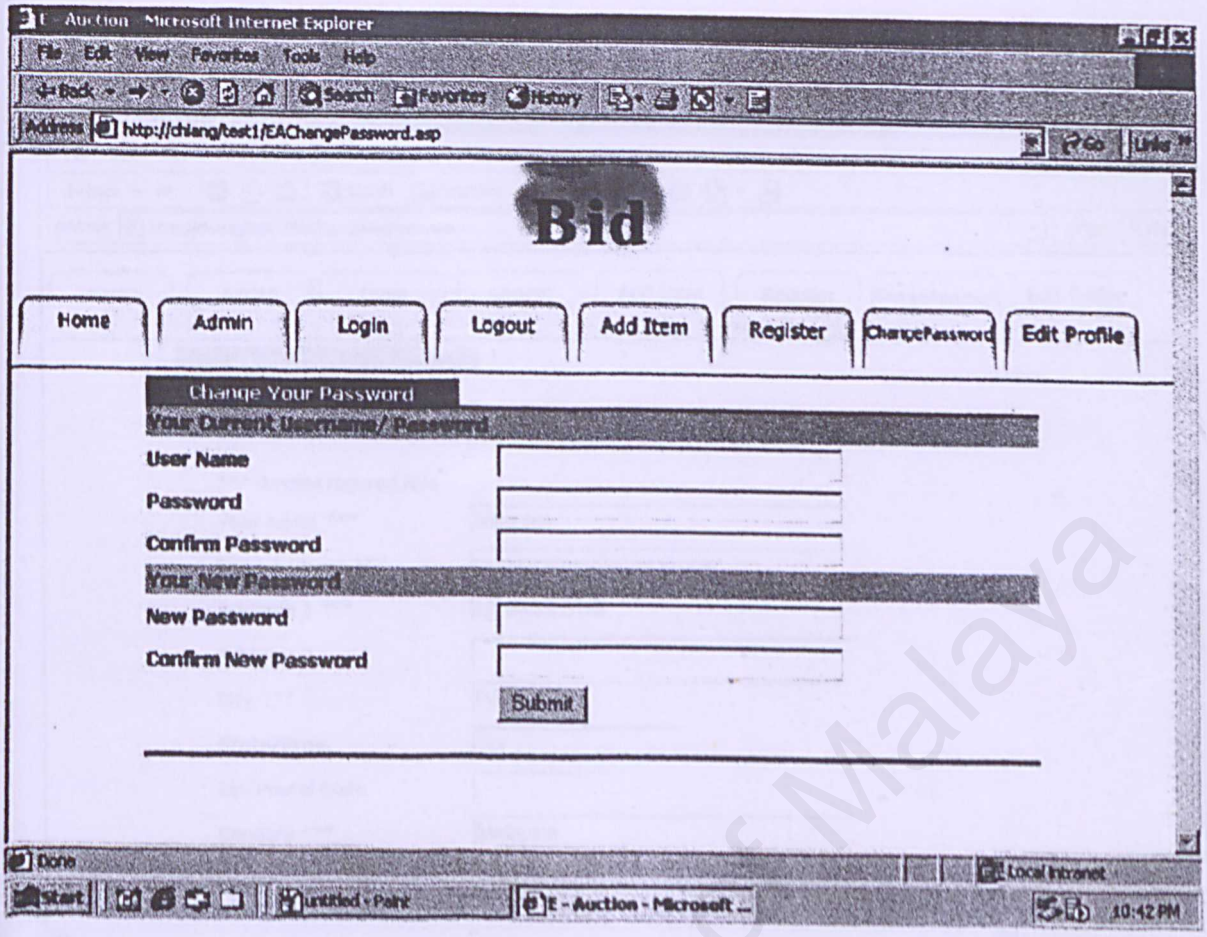
After the user key in the item's details and click the submit button, they will be brought to this page to see a preview of the item that they are going to submit. This is to confirm that the descriptions or a detail of the item is correct and accurate. Then, they can submit the item by click on the confirmation button below. The page will show that the item added successfully.

Register :



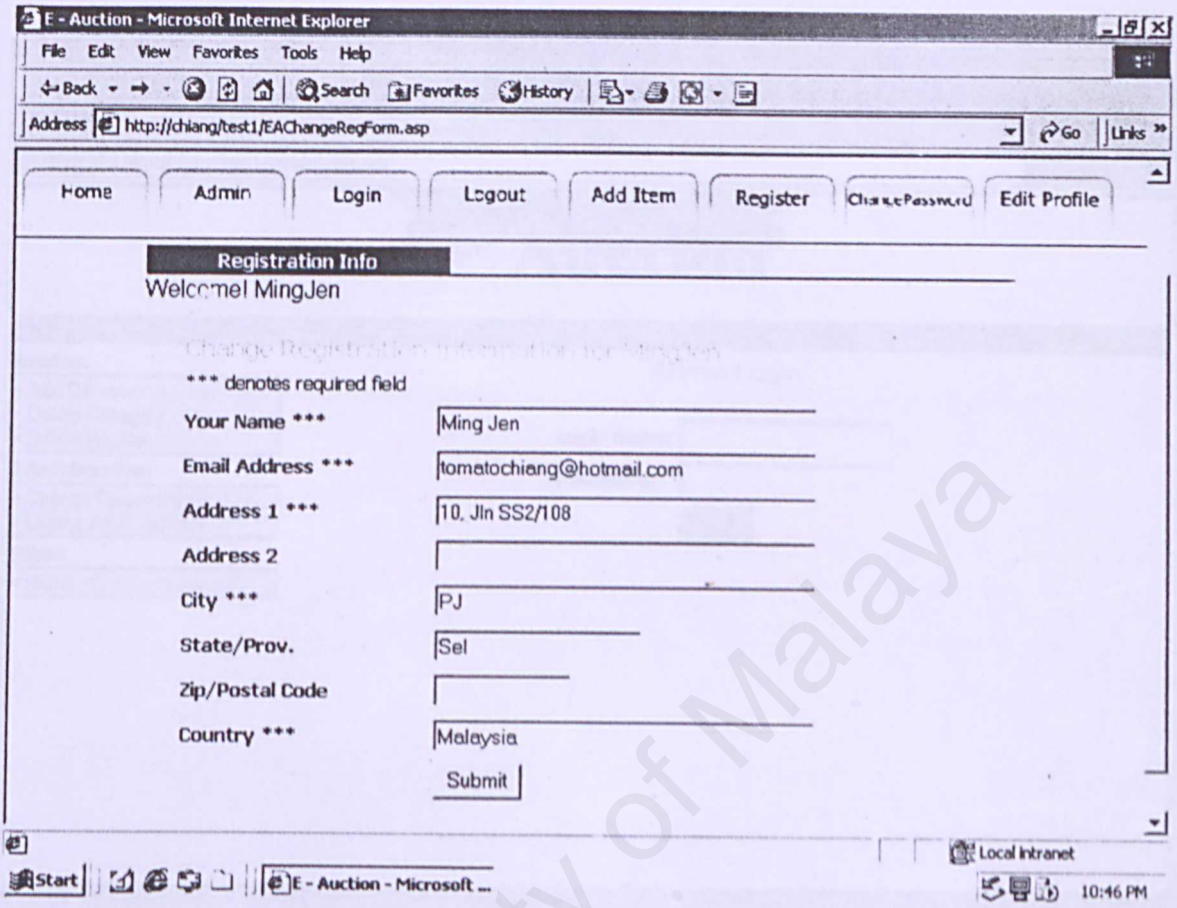
If the user is not registered yet, he can click the "Register" link. This page will be shown. The user can fill in his personal particulars. The box with the *** symbols before must be filled in. If not, error message will promt him to reenter the particulars that are not being filled.

Change Password:



The user may want to change the password for security reason. The user will have to key in his User Name in the first textbox, the current password in the second textbox and retype current password in the third textbox. The new password will be type in the fourth textbox and reenter it in the fifth textbox to validate it. Then, click on the submit botton to change the password.

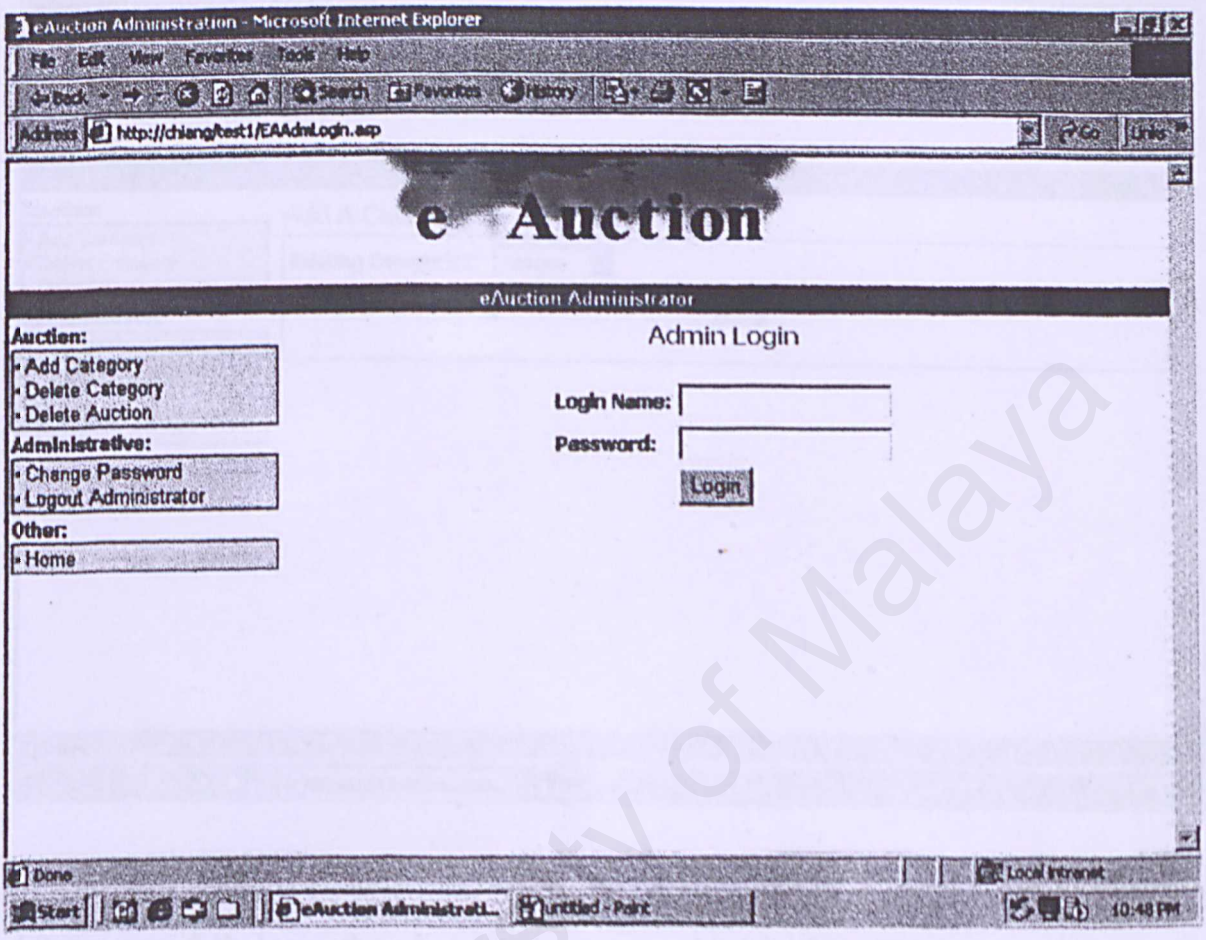
Edit Profile :



When the user click on the "Edit Profile" link, the user will be bring to this page. It displays the profile of the user. The user may want to change some particulars or update their personal particulars. By clicking the submit button, the user profile will be updated.

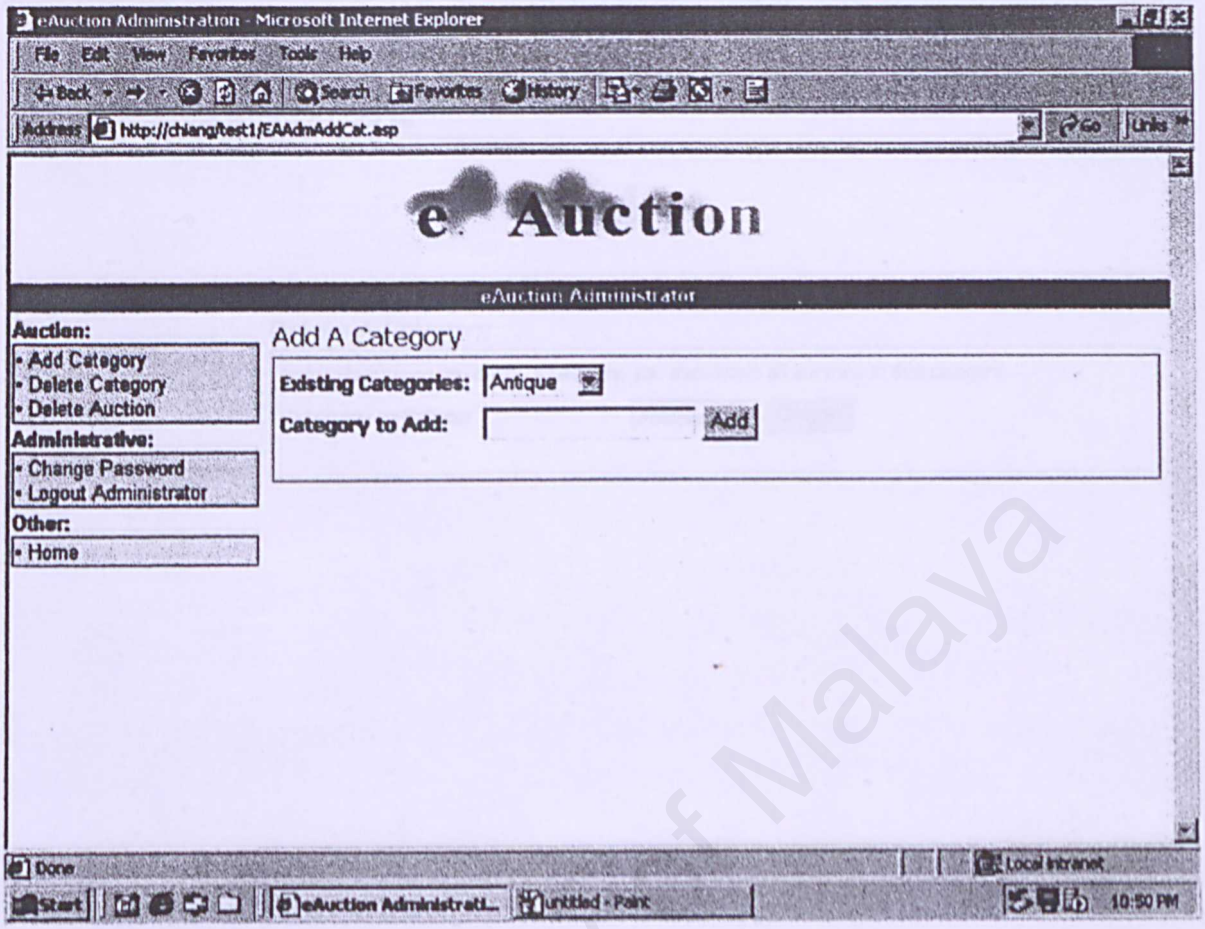
Admin Part:

Login :



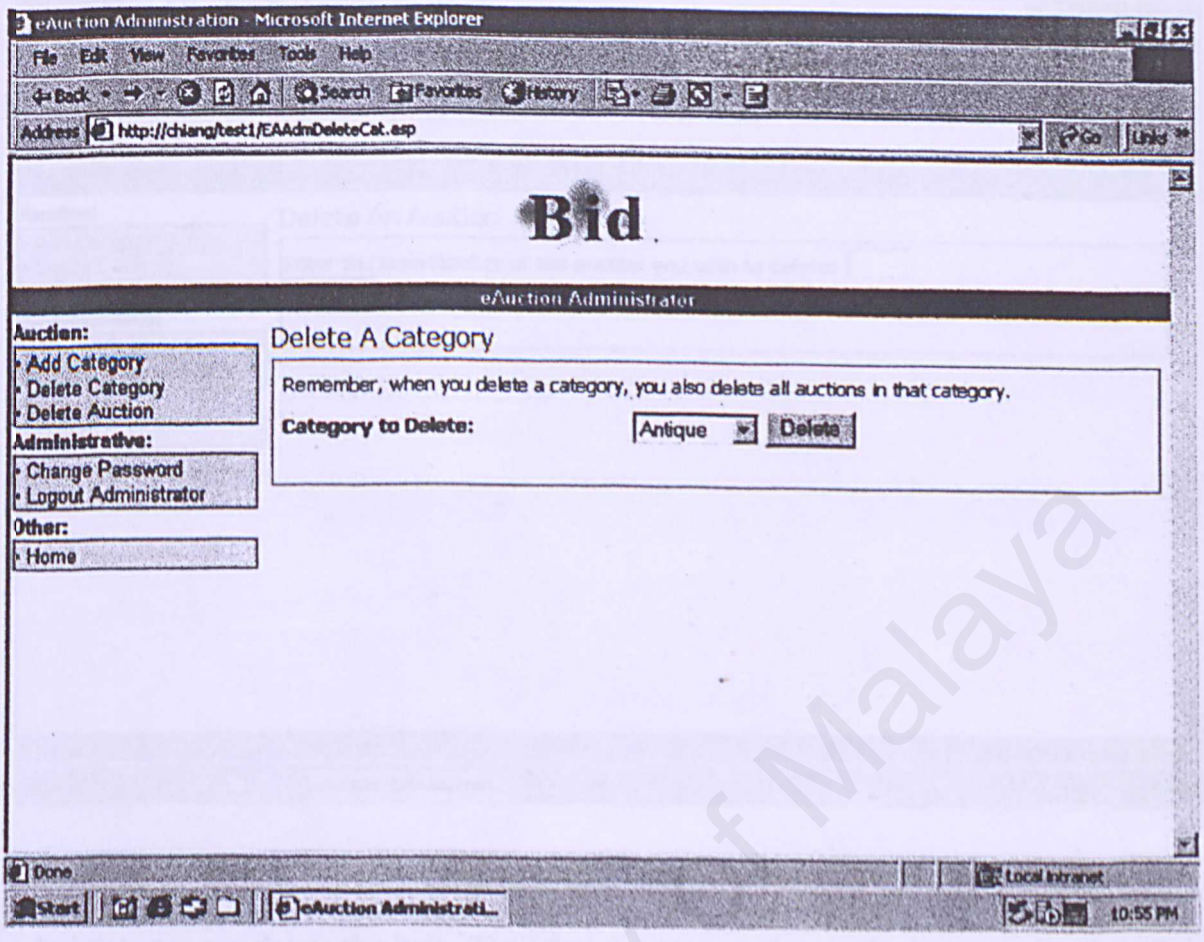
When the administrator click the "Admin" from the main menu, this page will be shown. The administrator has to key in the login name and password in order to perform some management task and maintenance task like "Add Category" , "Delete Category" and "Delete Auction" After the administrator login then only can he access the other link

Add Category :



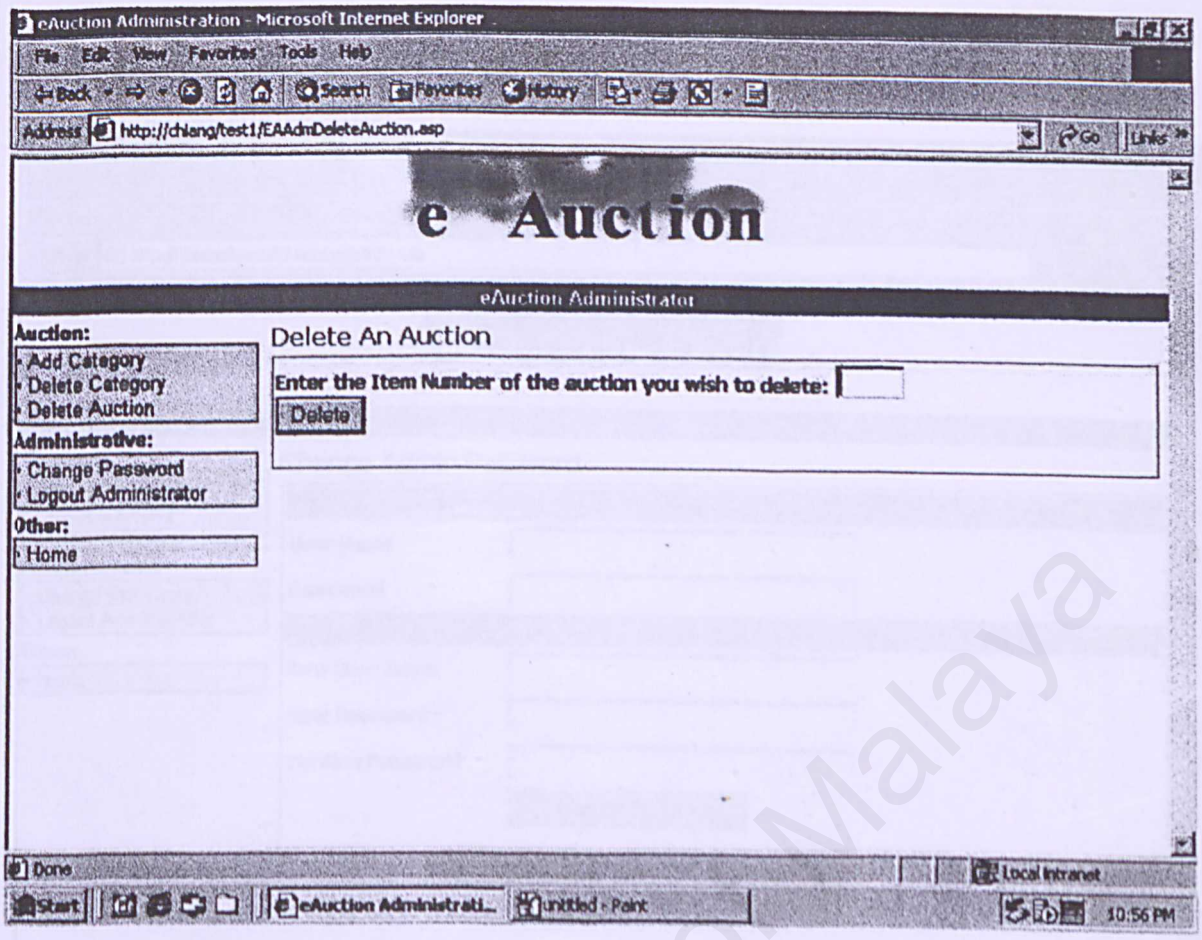
After successfully login, the administrator can see this interface. This page enables the administrator to add new category which he thinks is appropriate or after the motivating request from the user

Delete Category :



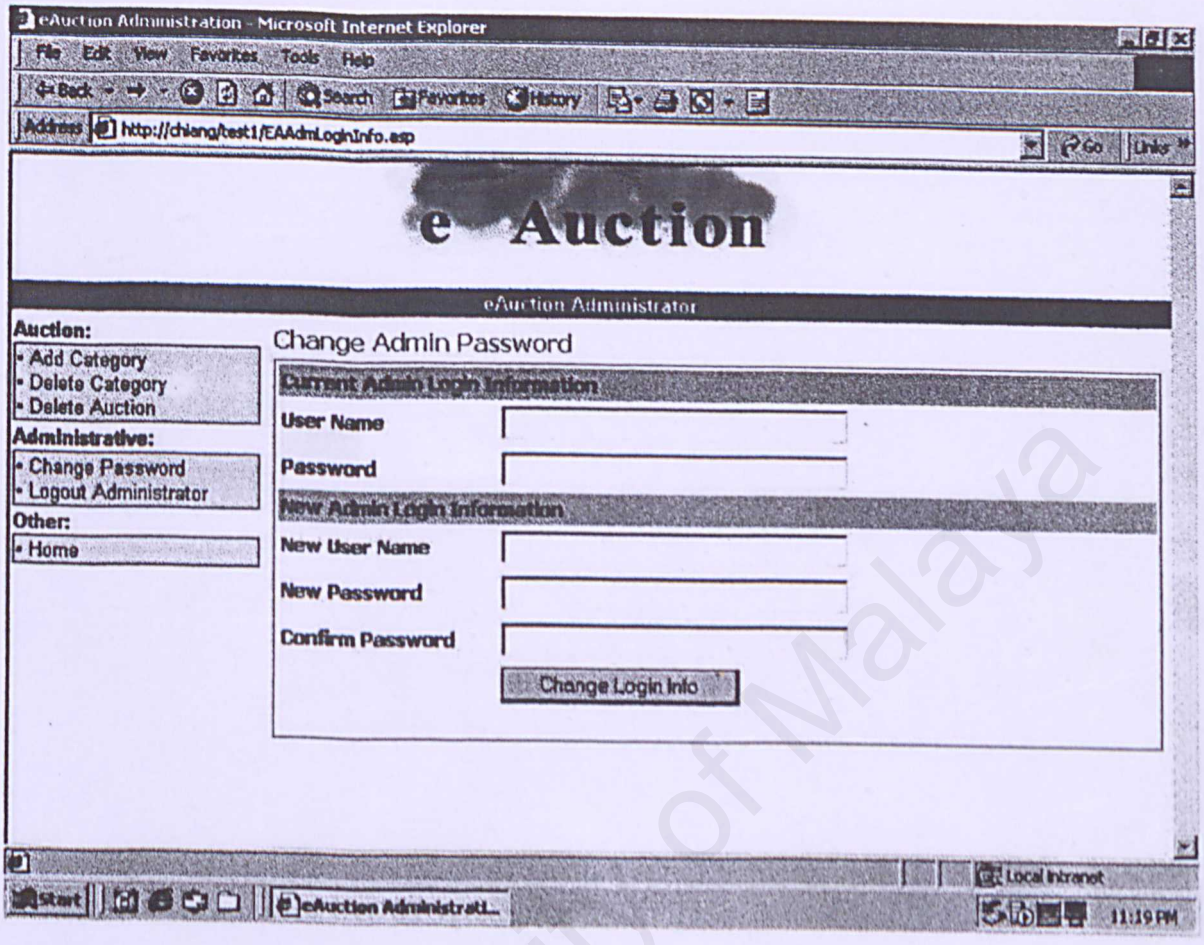
This page is used to delete the category when the category is unappropriate or the response is poor. This will also delete all the items within this category. Use this function with caution.

Delete Auction :



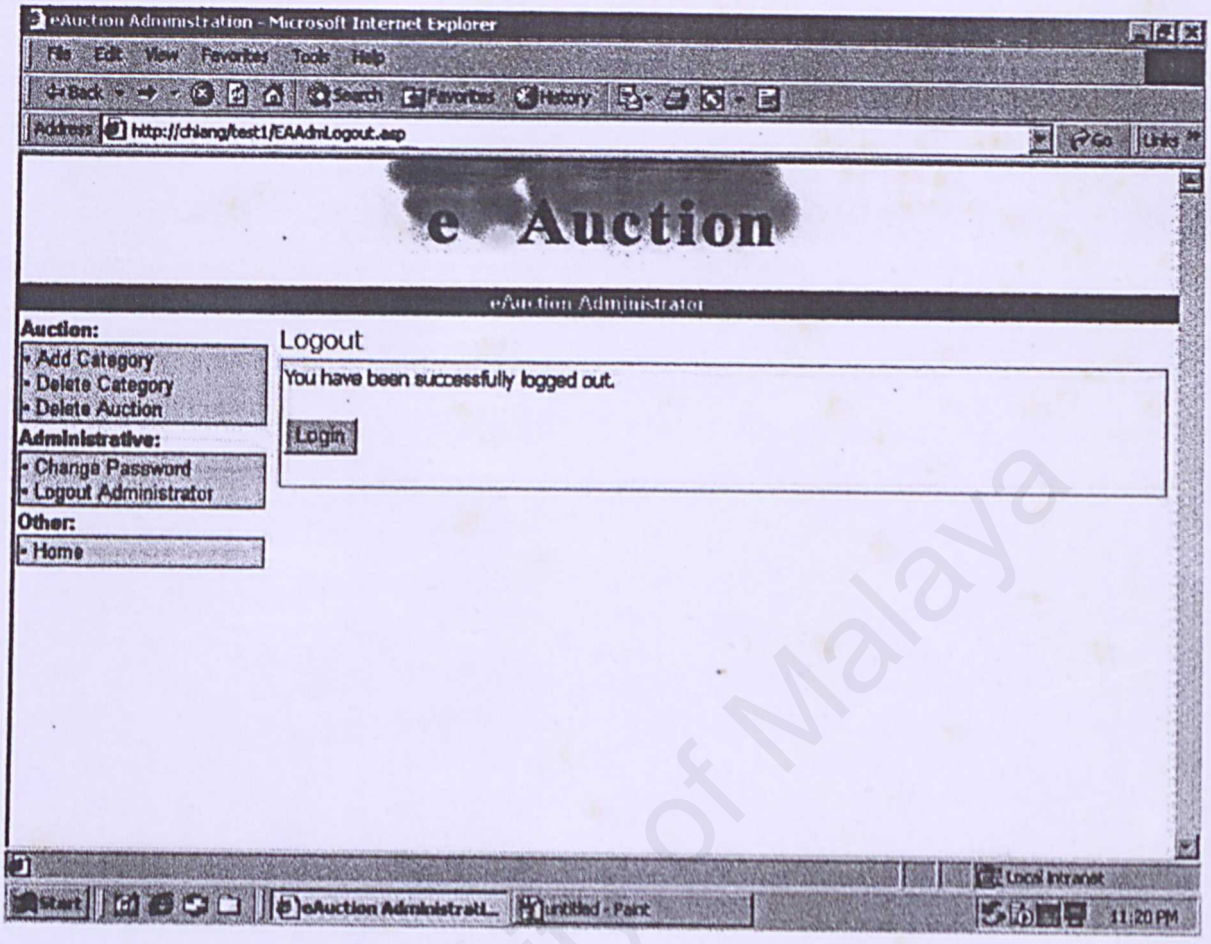
If some of the user sell the item that is unappropriate or some illegal item, then the administrator can delete the item. The administrator can key in the item number into the textbox and then click on the delete button. The item will be deleted. The administrator can also delete the closed auction.

Change Password :



Actually, this page has two functions. The administrator can change the User Name and the Password at the same time for security reason. The New User name will be used for the new administrator. The new password require confirmation by retype the new password in the fifth textbox.

Logout :



After performing the maintenance tasks, the administrator will have to log out for security reason. This can be done by click on the Logout Administrator link. The Home link will link to the main page.